

Agricultural Policy Research in Africa (APRA)

Research Programme Consortium

Commercialisation, Women's Empowerment and Poverty Reduction



Contents

Summary	4
1. Indicators of Agricultural Commercialisation	7
1.1 Commercialisation of livestock activities	10
1.2 Valuing non-marketed production when calculating the HCI.....	11
References	13
2. Poverty and Inequality Indicators	14
2.1. Poverty and inequality: an introduction	14
2.2. Indicators	17
2.3. Subjective poverty measures	21
2.4. MPI	22
2.5. Data and sampling	24
2.6. Conclusion	24
References	24
3 Food and Nutrition Security Indicators	26
3.1. Introduction	26
3.2. Consequences and indicators for FNS	29
3.3. Selection of FNS indicators	30
3.4. Handling seasonality in FSN measurements: suggestions	31
3.6. Proposed indicators: details.....	32
References	37
4. Women's Empowerment Indicators	41
4.1. Introduction.....	41
Indicator 1: Impacts on unpaid care work of women's participation in commercialised agriculture ..	42
Indicator 2. Impacts on control of income of women's participation in commercialised agriculture .	43
Indicator 3. Food security and nutrition	45
Indicator 4. Collective action by producer networks and groups to address conditions of employment, producer contracts, etc	46
Indicator 5. Land rights	46
References	50

5. Employment Outcome Indicators.....	55
5.1. Introduction	55
5.2. The challenges of capturing rural employment issues: what is missing and why?	55
5.3. Key indicators: quantity and quality of labour outcomes.....	57
5.4. Data collection issues and options.....	67
5.5. Concluding remarks	70
References	71

Summary

The **Agricultural Policy Research in Africa (APRA) Programme of the Future Agricultures Consortium** (<https://www.future-agricultures.org/apra/>) is seeking to generate new evidence on pathways to agricultural commercialisation, assessing outcomes in relation to five key broad outcome areas – commercialisation; empowerment of women and girls; poverty and inequality; employment rates and conditions; and food and nutrition security (FNS). Through a range of data collection techniques – quantitative cross sectional and panel methods, tracker studies, case studies and qualitative investigation – APRA will be working to better understand the relationship of household level constraints and opportunities in relation to decisions about whether to engage with the market, and on what terms. The Consortium will study the different types of commercialisation, analyse their outcomes, explore longitudinal change over time, and identify different pathways of agricultural commercialisation and their outcomes.

Much of the debate about agricultural commercialisation offers simplistic dichotomous comparisons between, for example, large and small-scale farming, or export-oriented and domestic markets. There is often an assumption that there is one ideal type of commercialisation that can be realised through investment and policy intervention. Yet in practice there are diverse ways that different people engage with processes of agricultural commercialisation along value chains, from production to processing to marketing. This range of pathways will have both risks and benefits for different groups of people, often differentiated by gender. Our research will examine the consequences of different *types of commercialisation*, contrasting for example smallholder, contract farming and large-estate arrangements, and *pathways of commercialisation*, examining commercialisation over time and the outcomes for different people. A comparative research design, across six countries and between different cropping/livestock systems, will enable the APRA Programme to draw out wider recommendations that will help inform and guide investment and policy decisions around agricultural commercialisation in Africa into the future.

In practical research terms, the agenda described above requires that a range of indicators are specified in relation to our five main outcome areas. This document compiles five separate papers, each one reviewing the established literature on a specific outcome area and then providing a justification for the proposed indicators to be applied in the APRA studies. A summary of these indicators is provided below.

Summary of APRA Outcome Indicators

1. Agricultural commercialisation

Household Commercialisation Index (HCI)

Gives the degree of commercialisation as the percentage of crop production marketed. A value of zero signifies total subsistence, and an index approaching 100 indicates higher degrees of commercialisation.

Volume or value of production sold; share of production sold, at crop/plot level

Increases in this indicator within a given farm population over time are likely to be a reliable indicator of commercialisation.

Share of land devoted to crops that are sold

Can be good for intra-household analysis. Relies on being able to classify particular crops either as crops produced for market or as crops produced for home consumption.

Quantity of purchased inputs used

Increased use of purchased inputs is one of the major channels through which commercialisation enhances livelihood outcomes for producers.

Quantity or value of labour hired

Provides one of the major channels through which agricultural commercialisation enhances livelihood outcomes for households (often poorer households) that do not directly engage in the commercialisation process.

2a. Poverty

Income-based poverty

Total net income of each household calculated by collecting information on all stocks and flows of income. A minimum variable level is fixed below which people are classified as poor and above which as not poor.

Subjective perceptions of poverty

Self-assessment of the experience or ones' feeling about their situation of well-being or welfare. Concept of the economic ladder of life:

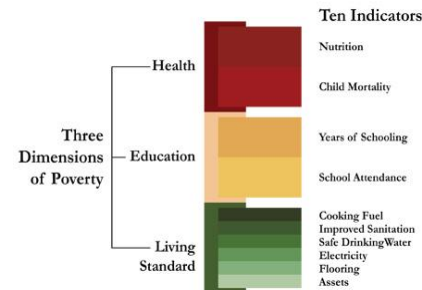
Subjective Ladder



Multidimensional Poverty Index (MPI)

Uses a set of vulnerability indicators to determine the extent of deprivation across education, health and standard of living.

The constituent parts of the MPI



2b. Asset-based poverty

Simple proxies

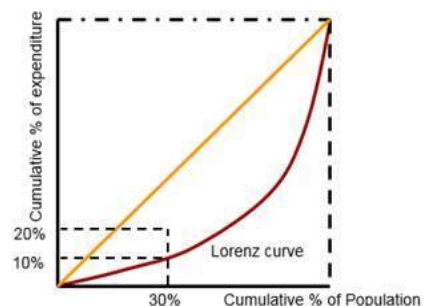
Reflect wealth and implicit measure of resilience:
-type of roofing, type of floor, source of electricity, type of toilet.

Asset indices

-Simple additive index.
-Tropical livestock units.
-Weighted index using principal components or factor analysis to determine the contribution of each of the items to the overall index.

2c. Inequality

Lorenz curves (LC) & Gini coefficients



LC plots cumulative proportion of income expenditure consumed by poorest x% of the population for values of x. Gini coefficient is derived from the Lorenz curve as area between LC and 45 degrees.

Others:

-Decile Dispersion Ratio

-Quintiles

-Land Gini coefficients

-Gender Gini coefficients

3. FNS

Food insecurity experience scale

Experience-based metric of severity of food insecurity that relies on people's direct responses (FAO, 2016). Range of severity of food insecurity:



Minimum dietary diversity index for women of reproductive age

A dichotomous indicator showing if women 15-49 years of age have consumed at least five out of ten defined food groups the previous day or night (FAO 2016).

4. Women's empowerment

Care work impact

A bespoke indicator for APRA to explore the impacts of unpaid care work on women's participation in commercialised agriculture, focusing on the social organisation of care and well-being.

Control over income

IFPRI's Women's Empowerment in Agriculture Index (WEAI) (IFPRI 2012) indicator on control over income captures new income and women's agency with respect to productive decisions and consumption. It provides insights into how the economic basis for care is affected by commercialisation of agriculture.



WOMEN'S EMPOWERMENT IN AGRICULTURE INDEX

Possession of legally recognised documentation for agricultural land

Women's land tenure security measured through documented ownership of land (UN SDG indicator 1.4.2). Effective ownership as an indicator of women's empowerment is explored through questions on management control over land.

5. Employment

Quantity and labour participation:

- Economically active or not
- Labour underutilisation



- Number of days per year effectively worked
- Occupation multiplicity
- Employment by status (% , adapted, specific)
- Labour intensity and labour demand
- Sector labour participation
- Casual workers in agriculture/rural sectors

Quality of labour:

- Low pay rate (below 2/3 of median)
- Percentage of wage workers paid in kind
- Implicit/imputed remuneration of contributing family workers
- Agriculture wage index
- Farm income volatility

1. Indicators of Agricultural Commercialisation

Colin Poulton¹

Poulton (2017:4) defines agricultural commercialisation as occurring “when agricultural enterprises and/or the agricultural sector as a whole rely increasingly on the market for the sale of produce and for the acquisition of production inputs, including labour.” This definition encompasses two contrasting commercialisation dynamics:

- smallholder farm households shift from semi-subsistence agriculture to production primarily for the market, in the process coming to rely increasingly heavily on purchased inputs and perhaps also labour in their production.
- smallholder farm households are complemented or replaced by medium- or large-scale farm enterprises that are predominantly or purely commercial in nature.

Both dynamics can be observed in both crop and livestock activities. APRA will focus first on crops, then consider the application of the resulting indicators also to livestock production.

In areas of high population density, hence land scarcity, commercialisation within smallholder crop production does not result in major changes to the agrarian structure during the early stages of the structural transformation. Rather, it is typically only a minority of smallholder households that are able to commercialise their crop production activities. Successful commercialisation should lead to increased income, nutrition and other welfare indicators for household members, though not necessarily shared evenly between them. It may also generate increased casual employment for other rural residents. Some households will attempt to increase production for market and invest in additional purchased inputs in support of this objective, but if their efforts are not successful (due to adverse weather, disease or market conditions) they may sustain financial losses, with possible consequences for nutrition and other welfare indicators.

In the later stages of structural transformation, agricultural commercialisation is increasingly driven by market forces in the non-farm economy, leading to major changes in the agrarian structure. The first commercialisation dynamic then gives way to the second.

APRA research will not observe market-driven consolidation of smallholder farms during the consortium’s lifetime. However, it will examine the impacts of the establishment of new medium- and large-scale farms amongst existing populations of smallholder households. The establishment of such farms represents agricultural commercialisation at the sector level, as medium- and large-scale farms produce predominantly or purely for market (unlike most smallholders) and rely more heavily on purchased inputs and hired labour than most smallholders do. Thus, the absolute level of market-oriented activity rises. Even uncompetitive medium- and large-scale farms, that struggle for profitability and do not manage to scale up production and land use as anticipated, are likely to make incremental contributions to agricultural commercialisation at the sector level, assuming that they did not displace vibrant smallholder producers during their establishment.

By contrast, when examining initiatives designed to promote smallholder commercialisation, it is important to confirm that – and examine the extent to which – the initiatives have actually stimulated

¹ The author is grateful to Thom Jayne, Ephraim Chirwa, Steve Wiggins and Andy Catley for discussions and comments that informed this note.

agricultural commercialisation before attributing observed welfare outcomes (good or bad) to such commercialisation. What follows, therefore, is a brief review of a number of indicators for measuring smallholder commercialisation². All of these are intended as household-level indicators, although they could also be measured at area (e.g. district) or sector level. Longitudinal studies, in particular, may wish to collect data at area level to complement available data at household level. In practice, the choice of indicators will often be a function of available data.

Share of production sold

With two important caveats, this is arguably the best indicator of agricultural commercialisation, as it flows directly from our definition of commercialisation. For crops, a simple household commercialisation index (HCI) gives the degree of commercialisation as the percentage of total crop production that is marketed (Leavy and Poulton, 2007; Strasberg *et al.*, 1999):

$$\text{HCI} = (\text{gross value of all crop sales} / \text{gross value of all crop production}) * 100$$

Depending on the local production system (one, two or more harvests per year) and crops grown (mix of field crops, perennial crops and horticultural produce), this should be measured over a single agricultural cycle or other appropriate time period (e.g. past 12 months).

A value of zero signifies total subsistence, and an index approaching 100 indicates higher degrees of commercialisation, i.e. a greater percentage of crop production that is marketed.

The first of the two caveats is that this 'simple' index is actually quite data intensive, requiring information on:

- the volumes of all crops that the household produced in the given season or year, including those that were produced for home consumption;
- the sales value when crops were sold; and
- appropriate prices with which to value production that was consumed at home.

In household survey work, this may raise issues of respondent recall, as well as questions regarding the value of production that was consumed at home (guidance on this is provided below).

The second caveat is that the index makes no meaningful distinction between a farmer who produces just one bag of maize and sells that one bag, and one growing fifty bags of maize who sells thirty of them. On the basis of this index the first farmer, with an HCI of 100, would appear to be more commercialised than the second, who has an HCI of 60. In practice, smallholder households who grow more will often also sell more, albeit with variation according to household size and dependency ratios. Where the index is problematic is where there are distress sales of food crops by poor households. Thus, apparently high scores on the commercialisation index, driven by sales of crops that are also eaten by the household yet associated with low production volumes, should be examined as possible cases of distress sale. Distress sales are also likely to be associated with limited or no use of purchase inputs and/or adverse welfare indicators.

² The review draws heavily on Leavy and Poulton (2007).

At crop or plot level, share of production sold could provide a possible indicator of agricultural commercialisation for intra-household analysis if the researcher was confident that:

- within the local gendered division of labour, a particular crop was the responsibility of female household members and represented one of the main opportunities for produce sale for women; and
- sampled plots were managed and controlled by women and comprised a representative sample of such plots.

Volume or value of production sold

This is much less demanding of data than the HCI. If applied to cross-sectional data, it may conceal the degree of market orientation amongst certain small farms. However, it is less susceptible to the problem of distress sales than the HCI. Increases in this indicator within a given farm population over time are likely to be a reliable indicator of commercialisation.

Note that caution should be exercised in applying this indicator for single crops, rather than households. This is because households may switch between crops that they produce for market, according to changes in price, the local availability of crop-specific support services and other conditions. Therefore, rising production of a single crop may overstate trends in commercialisation amongst the smallholder population in question. This indicator should only be used if the researcher is confident that one crop dominates market-oriented production activity in a given locality.

Share of land devoted to crops that are sold

This is a fairly crude indicator, in that it relies on being able to classify particular crops either as crops produced for market or as crops produced for home consumption. This is straightforward for some crops, but not others. It may, however, provide some insight into commercialisation in situations where reliable data on crop sales are not available.

Quantity of inputs purchased

Because commercialisation should be driven by opportunities in output markets, this should not be the primary indicator of agricultural commercialisation. Increased use of purchased inputs is sometimes promoted (by external agencies) without the establishment of effective linkages to remunerative output markets. Some households may also purchase inputs using non-farm income sources, including remittances, without any intention of selling the resulting produce.

Nevertheless, as increased use of purchased inputs is one of the major channels through which commercialisation enhances livelihood outcomes for producers, as well as for the wider economy, quantity of inputs purchased is a good indicator to monitor. It should complement indicators (above) that assess engagement with the market for the sale of produce, to provide additional evidence of the commercialisation process.

Quantity or value of labour hired

Many of the comments about purchased inputs also apply to labour hire. This is a good indicator to monitor as it provides one of the major channels through which agricultural commercialisation enhances livelihood outcomes for households (often poorer households) that do not directly engage in the commercialisation process.

1.1 Commercialisation of livestock activities

Interactions between crop and livestock enterprises are hugely important throughout the process of agricultural commercialisation. Early on, livestock are a major source of power and nutrients for crop production. Increasingly, livestock enterprises become a major source of demand for cereal crops as components of animal feed. In some communities, livestock enterprises also represent a leading avenue for accumulation for eventual investment in productive activities outside of agriculture.

Delgado *et al.* (1999) highlight the significance of high income elasticity of demand for livestock products as a driver of change within livestock systems in countries experiencing rapid economic growth. In this phenomenon, as household incomes rise from low starting levels, a significant proportion of their additional income is spent on livestock products. Since then the proliferation of large-scale commercial enterprises rearing chickens and pigs has been noted across Asia. Where population densities are high (as is commonly the case in Asia), these rely on purchased feed, much of which uses ingredients (maize, soybean) imported from the Americas. Whilst large-scale commercial enterprises have responded to the rapidly growing demand for livestock products, this has not completely displaced smallholder households, but it has altered their position within relevant supply chains.

APRA focuses on commercialisation dynamics within African smallholder households where members respond to rising demand, in local or national markets, for livestock, especially chickens³, and livestock products such as eggs and milk. As with crop production, the gender dynamics of these commercialisation processes should also be examined.

The rearing or fattening of chickens and the production of eggs and milk are activities for which incomes and expenditures can meaningfully and fairly readily be calculated over the same recall period as is typically used for crops (e.g. one season or one calendar year). Therefore, several of the indicators set out above for crops can also be applied to these livestock enterprises. In turn, the relationship between these indicators of livestock commercialisation and key outcome indicators (household income, diverse poverty indicators, food and nutrition security [FNS], women's empowerment) can be examined. However, unlike crop production, where it is generally recommended that the indicators are measured across the whole range of crops produced, for the production of chickens, eggs and milk the indicators are most likely to be applied to individual enterprises.

³ In most APRA study sites where cattle are prominent, we expect them to perform some or all of the following functions: to contribute services to crop production (manure, animal traction), to act as a stock of savings and wealth, to have important social values and to generate occasional revenue from sales. However, we do not expect to find cattle (or small ruminant) production enterprises that are geared primarily to generating income from animal or meat sales, nor do we expect to see much change in this during the APRA studies. Therefore, unless qualitative work indicates noteworthy commercialisation dynamics in cattle or small ruminant production, it is suggested that any efforts to measure commercialisation focus on chickens, eggs and/or milk.

Share of production sold: in theory this can be calculated over an appropriate time period, just as for crops. However, APRA data do not contain information on chickens, eggs and milk produced for home consumption – only sold.

Volume or value of production sold: as with crops, increases in this indicator within a given farm population over time are likely to be a reliable indicator of commercialisation.

Quantity of inputs purchased: as with crops, this should be a supporting indicator. Inputs and services purchased may include chicks, feed, vaccinations and other drugs.

Quantity or value of labour hired: this could be relevant for better capitalised smallholder enterprises – a good indicator of commercial orientation.

1.2 Valuing non-marketed production when calculating the HCI

An issue that arises in the calculation of the HCI is how to value agricultural production that is consumed at home. Theoretically, there exists a shadow price for such commodities that falls somewhere in the price range between the price that the household could obtain from selling the commodity and that which it would pay to purchase it. This shadow price is unique to each household (for each commodity), reflecting its unique combination of assets and opportunities, and is unobserved where a crop is neither sold nor bought (Barrett, 2008). We, therefore, have to look for the best available proxy when calculating the HCI.

APRA household surveys are only collecting information on commodities sold, not purchased. Therefore, the Consortium cannot distinguish households that both produced and purchased a given commodity (in which case the shadow price of own consumption is the local purchase price) from those that consumed only what was produced within the household. Moreover, the only prices available within APRA household data are sales prices.

Under these circumstances, one option is to look for secondary data on crop prices. However, the availability of such data will vary from country to country, necessitating different assumptions being made across countries to convert available data into appropriate farmgate values. Therefore, our preferred approach is to use the available data on sales prices and to recognise the bias that this introduces into our HCI estimates (other commercialisation indicators described above do not involve valuing crops consumed at home).

Consider first those households that sold a proportion of a particular crop and consumed the remainder:

- The proportion that was sold can be valued at actual sale prices. This way, if there were more commercially oriented households who achieved some form of price premium through raising product quality, accessing more remunerative marketing channels or storing their crops until the price rose, this will be reflected in the HCI.
- The proportion that was consumed at home can be valued at the same sale price(s)⁴, because the cost of consuming this portion at home was the income foregone from selling it.

⁴ If a household made multiple sales at differing prices, a weighted average price should be used.

For households that did not sell any of their production of a particular commodity, their production can be valued at the local median sales price for that commodity. This will under-estimate the value of that production for most⁵ of these households and means that their calculated HCI score will be correspondingly over-estimated. How substantial is this bias likely to be? In a village where some households sell a particular crop and others look to buy it, farmer-farmer sales should keep local marketing margins low. However, if the majority of sales of a particular commodity are made soon after harvest and the local price then rises steadily through the lean season, the bias will be more substantial. On the other hand, if the same methodology is adopted over both waves of the panel, the impact on our analysis will be minimised.

A final question concerns what to do when no – or few (e.g. less than five) – households in a village or division record sales of a particular commodity, yet households do grow it for home consumption. In these cases, the preferred approach is to calculate the median price at the next larger unit of aggregation (e.g. district or region) and to use this price. Especially where the crop is relatively minor within the cropping mix (hence few if any households have sold it), the bias introduced into HCI calculations by this approach should be small.

Possible complementary studies

In the preceding paragraphs a pragmatic approach to valuing agricultural production consumed at home for the purpose of calculating the HCI, given available APRA data, is recommended. To explore the impacts of this approach on HCI estimates, APRA could undertake regression analysis to explain the variation in prices received by farmers over time. Explanatory variables could include indicators of market access (e.g. distance to tarred road or district centre), month of sale, volume sold, education of the head of household etc. The study could then re-estimate the value of non-marketed production using household-specific predicted prices and examine the effect of these new estimates on HCI.

As well as using its own data to explain the variation in prices received by farmers over time, APRA could compare findings using additional data sets, e.g. Living Standards Measurement Survey (LSMS) panel data from any of five or six countries.

For further consideration of this topic, APRA could identify panel data sets that contain both purchase price and sales prices of crops, then use these to determine both the difference between these two prices at any given month for a given district, and the factors that influence the size of this margin over time and across districts.

⁵ If we assume that households situated close to a tarred road or district centre are most likely to sell produce, then the sales prices that they record should also be higher than the (hypothetical) sales prices that more remote households would have achieved had they sold. The median value of *observed* sales prices will, therefore, fall within the range between (hypothetical) sales and purchase price for these more remote households.

References

Barrett, C. (2008). Smallholder market participation: Concepts and evidence from eastern and southern Africa. *Food Policy* 33(4): 299-317.

Delgado, C., Rosegrant, M., Steinfeld, H., Ehui, S. and Courbois, C. (1999). *Livestock to 2020: The Next Food Revolution, 2020 Vision*. IFPRI/FAO/ILRI, Washington, DC/Rome.

Leavy, J. and Poulton, C. (2007). *Commercialisations in Agriculture (Working Paper)*. Future Agricultures Consortium, Brighton.

Poulton, C. (2017). *What is Agricultural Commercialisation, Why is it Important, and How do we Measure it?* APRA Working Paper WP06, Brighton.

Strasberg, P., Jayne, T., Yamano, T., Nyoro, J., Karanja, D. and Strauss, J. (1999). *Effects of Agricultural Commercialization on Food Crop Input Use and Productivity in Kenya*. Policy Synthesis for USAID – African Bureau Office of Sustainable Development. Michigan State University, East Lansing.

2. Poverty and Inequality Indicators

Ephraim Chirwa, Rachel Sabates-Wheeler and Amita Saha⁶

2.1. Poverty and inequality: an introduction

Poverty and inequality are powerful concepts identifying the poor and variations in their living conditions (McKay, 2002; Ravallion, 1998) and are therefore intrinsically linked to welfare. Researchers and policymakers measure poverty and inequality using monetised estimates of consumption and income (Foster *et al.*, 2013) and, along other dimensions of assets, subjective views of well-being, opportunities and capabilities. A direct measure of poverty is to set a poverty line and count the number of people living with either income or consumption levels below that line. Inequality is measured by assessing the distribution of income or consumption.

The first step in measurement is to choose how poverty and inequality will be assessed, i.e. whether to use income or consumption as the primary basis for measurement. Both income and consumption have advantages and disadvantages as measures of living standards. Consumption is often used to measure monetary poverty in developing contexts. Yet, it does not capture intra-household dynamics, making it difficult to assess the extent to which particular sources of livelihoods may apply to particular members of the household. Intra-household dynamics however can be captured with income information.

The second step involves the identification of some kind of threshold to identify the poor by selecting a poverty line that indicates the minimum acceptable level of income or consumption, before aggregating the data into an overall poverty measure (Foster *et al.*, 2013). The World Bank defines the absolute poverty line at US\$1.90 a day, assuming the poverty line to be constant. Absolute poverty lines are usually applied in less developed countries. In a minority of case, relative poverty lines, as a constant fraction of an income standard, are applied.

In comparison to poverty, inequality is a broader concept that is defined over the entire population and does not only focus on the poor. Making use of consumption or income, the population can be sorted from poorest to richest, and measures such as the Gini coefficient, which ranges from 0 (perfect equality) to 1 (perfect inequality), can be calculated. Inequality indicators can be used to assess inequality by different subgroups of the population and by region.

The use of income or consumption to set poverty lines and assess inequality still pose measurement issues. Specifically, neither income nor consumption may be able to capture a household's long-run economic status or wealth inequality. Hence, APRA will also review the use of asset-based indices for poverty, where there is much less recall bias or mismeasurement in questions such as whether the household owns a bicycle, than there is in recalling consumption or income.

Subjective measures of poverty involve self-assessment of a person's or household's experience of poverty or expressed feelings about their situation of well-being or welfare. The type of measure counteracts the concern in empirical studies that income is not an appropriate indicator for explaining happiness and welfare (Ravallion and Lokshin, 2000; Rojas, 2008). The Multidimensional Poverty Index

⁶This draft version is revised in light of comments from Colin Poulton; suggestions from members at the APRA Annual Review and Planning Workshop in South Africa in January 2018 are gratefully acknowledged.

(MPI) is an internationally recognised method that incorporates ten aspects of household poverty into one index. This is also reviewed below.

This paper begins by reviewing existing methods used to measure poverty and inequality and discuss our choice of some basic indicators. While it reviews and make use of monetary and non-monetary measures of poverty an inequality, the paper also explores the use of asset indices to deal with recall bias, seasonality and mismeasurement that can occur with income and consumption-based measures. APRA's objective is to use measures of welfare to examine underlying relationships between monetary and non-monetary indicators of well-being and agricultural commercialisation with other social and political economy variables. APRA will make use of poverty and inequality indicators to answer the following questions: (i) How many households are poor? (ii) What is the intensity of poverty? and (iii) What is the extent of inequality? The indicators will feed into examining the impact of commercialisation choices on poverty and inequality outcomes over time.

Income versus consumption

Low income and limited consumption are both important aspects of poverty. Both theoretical and practical reasons must therefore be considered when deciding which indicator to select as a proxy for welfare.

The choice between income and consumption is heavily influenced by the advantage that consumption is not closely tied to short-term fluctuations in income. Foster *et al.* (2013) outline that it is easier to measure components of income such as wages and salaries, and it may also be possible to get adequate (if understated) information on interest, dividends, and self-employment income; but it is hard to get accurate farm income measures. Income may also be understated as people often forget or are reluctant to disclose the full extent of their income.

Reviewing the conceptual approaches to the measurement of welfare in a household (World Bank, 2014), this paper recognises household consumption expenditure as the most popular measure of poverty, as well as the following issues in adopting a consumption approach to poverty, especially for APRA's context:

- i. Collection of consumption expenditure data is very time intensive with food consumption data typically collected over a seven-day recall period; and price data needs to be collected on all food types/groups.
- ii. Social transfers, such as free education, health, etc., which are received in the form of services from government or other sources are extremely difficult to value and are often excluded.
- iii. Estimates are based on household surveys, which tend to be one-year studies with limited coverage and may become quickly outdated.
- iv. In many developing countries, the distinction between cash outlays for personal business and those for household use are often blurred.

This paper proposes using income-based poverty and inequality indicators. The choice of income over using consumption expenditure is driven mainly by the fact that consumption expenditures are tedious to collect and need long and exhaustive sets of questions to obtain credible data. Another strong argument for using income is that it is possible to assign particular sources of income to particular members of the household, while consumption is only occasionally measured for individual household members (Deaton and Zaidi, 2002). One aim of APRA is to identify individual-level decision-making and outcomes; therefore, using income-based poverty and inequality indicators fits in with the Consortium's wider objectives. Also, if there are seasons when people have little or no incomes,

consumption is often financed from assets, therefore APRA will measure living standards by gathering data on income and assets (Deaton and Zaidi, 2002).

When using income to measure poverty, decisions have to be made on whose income is being compared, what will be counted as income and how to enable comparison between different individuals in different circumstances. Poverty lines can then be fixed based on income, using a minimum level below which people are classified as poor and above which as not poor, and inequality indicators can be calculated. In addition, APRA will identify individual and household income sources.

Micro-level household data on income is essential to examine information about the distribution of income across members of a society (OECD, 2013). Household income consists of all receipts received by the household or by individual members of the household, and excludes any irregular one-time receipts. A starting point for estimating income measures is the concept of personal income which is meant to capture all forms of income received by individuals, and typically covers the following: income from employment (both paid and self-employment); property income; income from the production of household services for own consumption; current transfers received (other than social transfers in kind); and social transfers in kind. Poverty measures use net income – that is, total income minus direct taxes (income tax, national insurance and council tax) plus the value of any social security benefits received. This is the income that people have available to buy goods and services.

Absolute versus relative poverty lines

A formalisation of the concept of poverty is the identification of a poverty line for a household, defined as the minimum income or consumption needed to achieve at least a minimum level of utility, given the level of prices and the demographic characteristics of the household (World Bank, 2014).

Poverty lines usually use indicators based on monetary variables such as income. A minimum variable level is fixed below which people are classified as poor and above which as not poor. Most evaluations of poverty have either used an absolute approach that takes a poverty line to be a constant, or a relative approach that uses a constant fraction of an income standard (Foster *et al.*, 2013).

Examples of an absolute poverty line include the World Bank's US\$1.90 line at 2011 purchasing power parity prices, and domestic poverty lines in most developing countries that are used to compare poverty within the country over time. Relative definitions of poverty are defined in terms of a minimum acceptable standard of living in higher income countries such as the European Union's country-level poverty lines set at 60% of the median (disposable) income (Foster *et al.*, 2013).

Under APRA, comparison both within and between countries, across relatively moderate spans of time, will use an absolute poverty line to examine the link between commercialisation and poverty. Legitimate comparisons of poverty rates between countries can then be made if the same absolute poverty line is used in all countries (World Bank, 2012).

2.2. Indicators

Income and assets data will be used to construct a number of poverty and inequality indicators discussed below⁷. Going beyond the traditional income measures, APRA will also estimate subjective measures of poverty and the MPI.

Poverty

Poverty headcount is simply the proportion of the population for whom income is less than the poverty line. However, the headcount is not sensitive to changes in the income level of the poor as long as incomes do not cross the poverty line (Deaton and Zaidi, 2002) therefore it is harder to capture marginal improvements in poverty.

Poverty rate is the ratio of the number of people whose income falls below the poverty line. The poverty line can be taken as half the median household income of the total population (OECD, 2017), or with alternate thresholds. Headcount and poverty rates help identify and assess the number of poor. Specifically, the strength of the poverty rate is being calculated using ratio analysis, rather than any one variable, often unrepresentative of most of the population, such as per capita income or gross domestic product. However, two countries with the same poverty rates may differ in terms of the relative income-level of the poor (OECD, 2017), such that comparisons across countries should be made with caution.

World Bank (2014) outlines the **poverty gap index** that measures the intensity of poverty. It adds up the extent to which individuals on average fall below the poverty line, and expresses it as a percentage of the poverty line. Using the index function I , Poverty gap (G_i) for household i ($i = 1.., N$) is defined as the poverty line (z) less actual income (y_i) for poor individuals: $G_i = (z - y_i)I(y_i < z)$; the gap is zero for everyone else. Poverty gap index (P_i) is written as:

$$P_i = \frac{1}{N} \sum_{i=1}^N \frac{G_i}{z}$$

Evidence suggests that the smaller the poverty gap index, the greater the potential economies have for implementing a poverty alleviation budget by identifying the characteristics of the poor (World Bank, 2014). Strengths of the poverty gap index is that it shows how much would have to be transferred to the poor to bring their incomes up to the poverty line (as a proportion of the poverty line). However, the limitation is that the interpretation in terms of cost of eliminating poverty is reasonable only if the transfers could be made perfectly efficiently, which is implausible as it assumes that policymakers have perfect information.

Inequality

Inequality can be examined by examining the income shares of individuals along different parts of the distribution, for example by dividing the population, ranked by the living standard measure, into quintile groups. The following tools can then be used to assess inequality (World Bank, 2014).

Lorenz curve plots the cumulative proportion of income of the poorest $x\%$ of the population for different values of x , as shown in Figure 1 below. On the horizontal axis, the cumulative proportion of

⁷Here we outline the basic indicators. We will also explore the estimation of advanced measures such as the Watts index, the squared gap measure, the Foster-Greer-Thorbecke indices, the mean gap measure, and the Clark-Hemming-Ulph-Chakravarty indices.

the overall population is taken into account after ranking the population from the poorest to the richest. On the vertical axis, the cumulative proportion of wealth is represented. The Lorenz curve reveals the percentage of income owned by x per cent of the population. It is shown in relation to a 45-degree line that represents perfect equality where each x percentile of the population receives the same x percentile of income. Thus, the farther the Lorenz curve is in relation to the 45-degree line, the more unequal the distribution of income. The Lorenz curve tells us what percent of income is owned by a certain percentage of the poorest population.

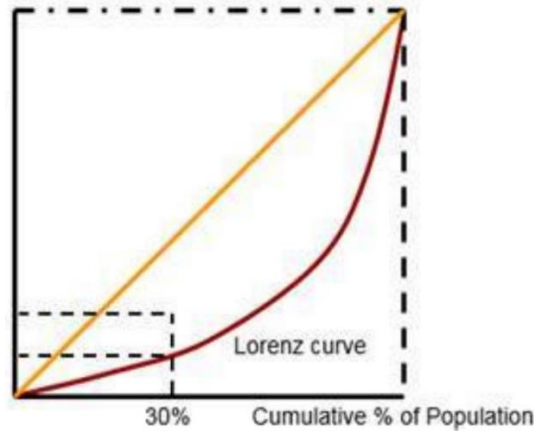


Figure 1: Lorenz curve

In Figure 1 for example the poorest 30% of the population have 10% of the total wealth. The Lorenz curve has a positive slope which means that the cumulative proportion of population increases as wealth increases.

Gini coefficient is derived from the Lorenz curve, and is defined as the area between the Lorenz curve and the 45 degree line, divided by the total area under the 45 degree line. This inequality index takes the value from 0 (perfect equality) to 1 (perfect inequality where one person earns all the income). The Gini coefficient can also be mathematically computed using the following formula:

$$G = \frac{1}{2} n^2 \sum_{i=1}^n \sum_{j=1}^n \|y_i - y_j\|$$

Where, G is the Gini coefficient, n is number of sample, y_i is the income of the i^{th} observation, and y_j is the income of the j^{th} observation.

The Gini index is the Gini coefficient expressed as a percentage, and is equal to the Gini coefficient multiplied by 100. Comparing the strengths and limitations of the Gini index (Foster *et al.*, 2013), we find that its strengths include the following:

- i. The Gini index can be used to compare income distributions across different sectors as well as countries;
- ii. It can be used to indicate how the distribution of income has changed within a country over a period of time (if inequality is increasing or decreasing).
- iii. It does not matter who the high and low earners are; or whether it is a rich or poor country on average; and it does not matter how large the population of the country is.

Limitations of the Gini index are that it is not easily decomposable or additive across groups, and it is not possible to test for the significance of changes in the index over time. Also, economies with similar

incomes and Gini coefficients can still have very different income distributions. This is because the Lorenz curves can have different shapes and yet still yield the same Gini coefficient.

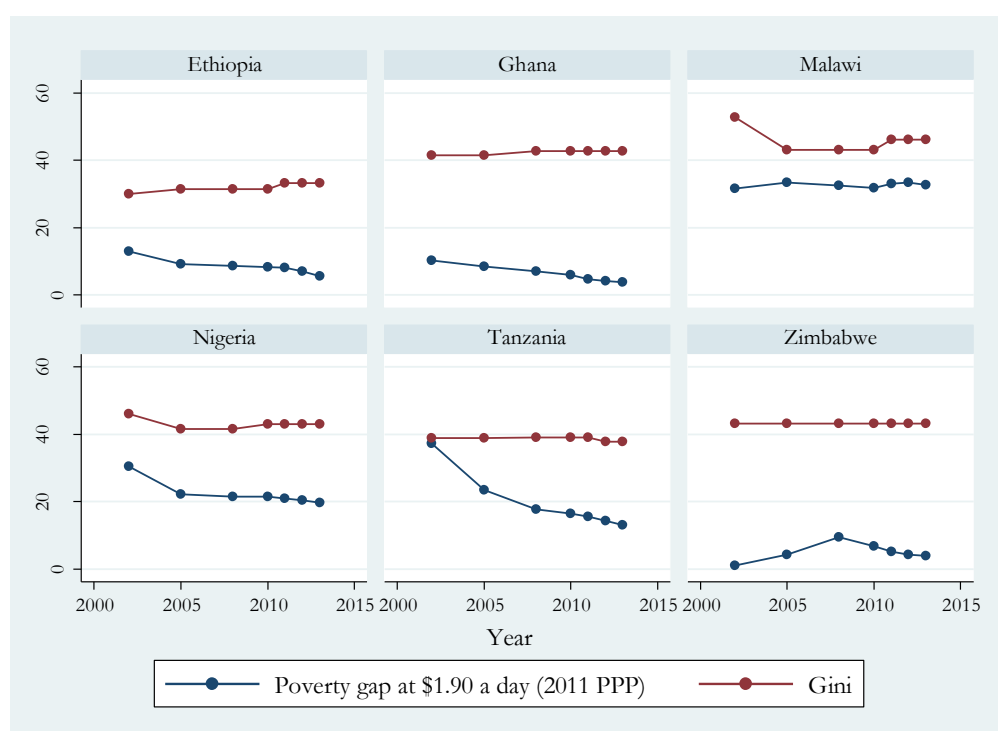
The **decile dispersion ratio** presents the ratio of the 10% of the population (90th percentile) to the 10% (10th percentile) of the poorest population to measure the extent of inequality. It is easily interpretable in that it compares the average of top 10% (the rich) against the average of the poorest decile, but it does not take into consideration the middle-income group and does not use the distribution within the top and bottom deciles.

A **quintile** represents 20% of the population, where the population has been ranked from poorest to richest. The first or bottom quintile thus represents the 20% poorest individuals in the population, whereas the fifth, or top quintile refers to the richest 20%.

The **Coefficient of Variation** is a poverty distribution's standard deviation divided by its mean. It is fairly easy to understand, and if data is weighted, it is immune to outliers. Further, it incorporates all data and is not skewed by inflation. However, it requires fairly comprehensive individual level data and it does not have a standard for an acceptable level of inequality.

Examining aggregated poverty and inequality indicators, using World Bank data across APRA countries in Figure 2, reveals that inequality has been consistently higher than poverty across all countries since 2000. As discussed above, the poverty gap estimates help identify the poor (10% in Ethiopia and Ghana, 30% in Malawi, 20% in Nigeria and Tanzania, and only about 5% in Zimbabwe), revealing some clear improvements in poverty intensity over the years. However, inequality, (that shows the spread of income distribution) has been consistently higher than poverty with very limited improvements across all countries since 2000. APRA data will be used to examine some of these findings in specific context and regions.

Figure 2: Poverty gap and Gini coefficient across APRA countries



Note: Author representation using World Bank data. Figure 2 shows poverty gap at US\$1.90 a day and the Gini coefficient across Ethiopia, Ghana, Malawi, Nigeria, Tanzania and Zimbabwe.

Assets

Aggregated indicators in Figure 2 reveal yearly fluctuations when using monetary measures. To deal with any issue of recall bias, seasonality and mismeasurement occurring with income and consumption-based measures of inequality, APRA will also construct asset indicators to proxy for wealth. Asset-based measures are able to depict household's long-run economic status and therefore are useful as stable proxy measures of well-being as these do not necessarily account for short-term fluctuations (Filmer and Pritchett, 2001).

Asset indexes are computed based on the assumption that agricultural households with better production equipment and durables, that live in a good-quality house, and have access to basic services are considered to have a higher level of material well-being than households with no/lower quality equipment and durables, poor housing and no access to services. Some broad categories for asset questions include the following:

Consumer durables:

Does the household own any of the following?

- Bicycle
- Mobile
- Cooking stove

Production equipment:

Does the household own any of the following?

- Knife
- Plough
- Sickle

Housing characteristics:

- What materials have been used to construct the roof of the house?
- What materials have been used to construct the floor of the house?
- What materials have been used to construct the windows of the house?

Basic services:

- What kind of toilet facility do members of your household usually use?
- What is your main source of drinking water?
- What is your main source of cooking fuel?

A question for measurement is then how various types of asset ownership can be aggregated into one variable to proxy for household wealth. If we limit aggregation to a linear index, there is still a question of how to make a choice of weights. Simple indexes are often used, as in the work of Johnston and Abreu (2013) which outlines the simplest asset index as a basic count of the assets. Equal weights have the appeal of simplicity, but applying numeric equality can mask the importance of certain assets over others. An example in Filmer and Pritchett (2001) is the availability of piped water that not only indicates greater wealth but may also reduce the time needed for water collection and indicate lower opportunity costs for other activities.

Filmer and Scott (2012) outline the use of principal component analysis to derive weights for asset indicators, where the underlying structure relates the indicator variables to a set of latent factors. A principal component based asset index makes use of the first principal component that captures the largest amount of information common to all variables to assign weights. Another approach is to

estimate the current value of household assets as weights. Asset variables can also be used by themselves in a linear multivariate regression equation that creates weights as linear regression coefficients. Another livestock asset-based indicator is Tropical Livestock Units which converts livestock numbers to a common unit (in 2005). The tropical livestock unit is commonly taken to be an animal of 250 kg live weight. Conversion factors are: camel = 1, cattle = 0.7, sheep = 0.1, goat = 0.1, pig = 0.2, chicken = 0.01 (HarvestChoice, 2011).

Various alternative weighting schemes have also been proposed in the literature, such as factor analysis and multiple correspondence analysis. Using APRA data, the Consortium will aim to compare results using various alternative weighting methods. Further, APRA will assess the performance of the index by examining if average asset ownership differs across the poor, middle, and rich households for each asset; its robustness to types of assets included; and comparability with measures of poverty (Filmer and Pritchett, 2001).

2.3. Subjective poverty measures

Subjective measures of poverty go beyond the command over market goods and services. These subjective measures of poverty and welfare are typically included in most Living Standards Measurement Survey (LSMS)-type of surveys undertaken in many developing countries. There are several approaches to subjective measures of poverty such as assessing the level of satisfaction with life or socio-economic situations (Rojas, 2008), the minimum money income concept and the concept of the economic ladder of life (Ravallion *et al.*, 2013).

First, the satisfaction in life approach measures subjective poverty in terms of self-reported experienced poverty and experienced income poverty (Rojas, 2008). The key question for experienced poverty that is asked of households or individual is: "Taking everything in your life into consideration, how satisfied are you with your life?" with response options ranging from extremely unsatisfied to extremely satisfied (five or seven categorical options). Similar questions are asked about economic satisfaction such as satisfaction with income, purchasing power, housing and financial situation. This can also be extended to satisfaction with other domains of life such as health, jobs or employment, family, friendship, recreation and leisure and community environment (Rojas, 2008). Based on the categorical response option subjective poverty line can be constructed to assess poverty.

Second, the minimum money income approach uses the minimum amount of cash deemed adequate to maintain a minimum basis standard of living. Households or respondents are asked questions like, "What income level do you personally consider to be absolutely minimal?" or, "What income do you need to make ends meet?" or, "What after-tax income do you consider very bad, bad, sufficient, good, very good?" (Pradhan and Ravallion, 2000; Ravallion and Lokshin, 2000). Pradhan and Ravallion (2000) use consumption adequacy questions to measure a social subjective poverty line with three response options: less than adequate, just adequate and more than adequate. The question posed to the household is, "Concerning your family's food consumption over the past month, which of the following is true?" The household is provided with three response options that are read as: (1) It was less than adequate for your family's needs, (2) It was just adequate for your family's needs, and (3) It was more than adequate for your family's needs. This question can also be asked of other aspects of well-being such as housing, clothing, children's schooling and health care. In a quantitative survey, the respondent is also provided with the definition of 'adequate' to mean no more nor less than what the respondent considers to be the minimum consumption needs of their family. Lokshin *et al.* (2004) asked a similar question with respect to expenses relative to food in the subjective poverty analysis in Madagascar, Wodon (2007) compared objective and subjective measures of poverty in different countries in Africa, while Kingdon and Knight (2006) used subjective and income measures in South Africa.

Third, the economic ladder of life approach uses a six-step ladder with the lowest step representing the poorest households and the highest step representing the richest household (Ravallion, 2012; Ravallion *et al.*, 2013). The key question posed is, “Imagine a six-step ladder where on the bottom, the first step, stand the poorest people, and the highest step, the sixth, stand the rich. On which step are you today?” Subjective poverty lines can be derived such that the proportion of households self-reporting to be on the first step can be deemed poorest or ultra-poor while those on the third step and below can be classified as poor.

The main advantage of the subjective welfare measures of poverty is that:

1. they are easy to capture in household surveys;
2. such questions tend to be included in most household surveys on standards of living and quality of life and, therefore, are readily available;
3. they are associated with low measurement errors;
4. they are based on the experience of the standard of living rather than some pre-determined minimum metric.

However, there are several weaknesses that need to be taken into account in the use of subjective measures of poverty:

1. subjective questions can be influenced by mood variability of the respondent;
2. there may be variability in people’s perceptions about notions of ‘poor’ or ‘rich’, or what is ‘low’ or ‘high’ (Ravallion and Lokshin, 2000);
3. there is the risk of downward bias in the poverty ratings by richer households and upward bias by poorer households (Ravallion, 2012);
4. subjective poverty measures are prone to heterogeneity in personality with some people have happiness traits compared to others (Ravallion and Lokshin, 2000).

Similar to multidimensional poverty measures (discussed below), the data requirements for subjective poverty analysis are not very demanding and questions capturing these aspects can easily be included in APRA questionnaires in each country study. Such questions do not take a lot of time to administer. Subjective poverty measures are an integral part of LSMS-type national household surveys and agricultural surveys making it possible to use such poverty indicators in APRA’s longitudinal studies in case the original studies captured subjective indicators of poverty.

2.4. MPI

Multidimensional poverty indices are motivated by the fact that poverty is multidimensional and cannot be adequately measured by a single aggregate such as income or expenditure. One of the most popular multidimensional indexes is the MPI which uses a set of vulnerability indicators in several dimensions to determine the extent of deprivation (Alkire and Foster, 2007; Alkire and Foster, 2011; Alkire and Santos, 2014). One of the main features of the MPI is the identification of the dimensions of vulnerability and indicators in each dimension with equal weights for each dimension and equal weights for each indicator in each dimension. The sum of the weights for all the indicators should add to one. The most popularly used index has three dimensions, namely education, health and standard of living and a total of 10 indicators of deprivations.

However, additional dimensions and indicators can be included as is necessary such as in Vijaya *et al.* (2014). For each indicator, a dichotomous variable is computed equal to one if the condition applies and equal to zero when it is not satisfied. Table 1 presents the elements and weighting in the

construction of the MPI. Several steps are undertaken for computation of MPI including determining indicators, setting cut-off points of deprivation for each indicator, applying the cut-off points on every individual or household, selecting the weights, creating a (weighted) deprivation score for each individual or household, determining poverty cut-offs for each individual/household, computing the headcount ratio and the intensity of poverty, and calculating the MPI (Alkire and Santos, 2014). According to Alkire *et al.* (2013) households are classified as poor if they are deprived in 33% of weighted indicators and classified as ultra-poor if they are deprived in at least 50% of the indicators. The MPI has been widely used to assess changes in poverty over time and to facilitate international comparisons (Alkire and Santos, 2010; Alkire and Seth, 2015; Vijaya *et al.*, 2014).

Table 1: MPI

Dimension	Indicator	Deprived if:	Index weight
Education	1) Years of schooling	No member has at least five years of schooling	1/6
	2) Children's school attendance	Any school age child is not in primary school	1/6
Health	3) Child mortality	Any child in the family has died	1/6
	4) Nutrition	A member is malnourished	1/6
Standard of living	5) Electricity	Household has no electricity	1/18
	6) Sanitation	Household's sanitation facility is not improved	1/18
	7) Safe drinking water	Household does not have access to safe drinking water	1/18
	8) Floor of house	Household has a mud or sand floor	1/18
	9) Cooking fuel	Household cooks with wood or charcoal	1/18
	10) Assets	Household does not own more than one asset (radio, TV, telephone, bike, motorbike, refrigerator), and does not own a car	1/18

Source: Adapted from Alkire and Foster (2007)

There are several advantages of the MPI as a measure of poverty. First, it uses indicators that are usually not difficult to measure in household surveys as they are based on observable characteristics. Most indicators relate to incidence of events, use of services and facilities and ownership of assets. This is with the exception of the nutrition indicator that requires standard malnutrition indicators such as body mass index (BMI) for adults, or for children weight-for-age scores below two standard deviations of reference populations. Secondly, it is closely linked to widely acceptable development indicators such as the Millennium Development Goals or Sustainable Development Goals (SDGs) (Alkire and Santos, 2014). Thirdly, the indicators used that capture basic needs and functions are widely available to facilitate international comparison without the need for valuation and currency conversions. Fourthly, it is less subjected to problems of seasonality. One weakness of the MPI however is the use of relative weights in its computation which can be set arbitrarily by an analyst (Ferreira and Lugo, 2013). Secondly, it computes a single value for a concept that is multidimensional.

The data requirements for the computation of the MPI are not demanding. Many household surveys and Demographic Health Surveys (DHS) already capture most of the indicators that are used in the MPI. For APRA Work Stream 1 work, these questions can easily be incorporated in the questionnaires and the data for these indicators are less subjected to measurement errors. Similarly, for APRA Work Stream 2, the MPI is one possible method of estimating poverty since most of the indicators are socio-economic characteristics of households and most national survey data particularly LSMS-type and agricultural surveys are likely to capture most of these indicators.

2.5. Data and sampling

There are various data and sampling issues in relation to collecting data for poverty and inequality indicators and are also more generally applicable. The first of these is general survey design, as even very large samples may give biased estimates for poverty measurements if the survey is not random, or if the data extracted from it have not been corrected for possible biases. Often the poor may not be properly represented in sample surveys, as they are harder to interview, live in remote areas, or are simply homeless (Atkinson *et al.*, 2002). A second major issue is that variability across time has implications for measurement using survey data. Our choice of income over consumption may in particular be affected by the fact that incomes of the poor often vary over time, particularly in underdeveloped rural economies, say depending on rain-fed agriculture, while consumption smoothing mechanisms are available to the poor (Ravallion, 2017). To account for any seasonality, we will capture incomes with reference to an entire year.

2.6. Conclusion

This paper has described some of the most well-known methods for measuring poverty, inequality and assets with the objective of informing choices for indicators and questions for survey instruments. A brief review of a range of indicators, the strengths and limitations of each indicator, the specific formula and the type of questions needed to create the indicator were provided. The purpose is to inform the choice of poverty and inequality indicators used by APRA. With robust poverty indicators it will be possible to evaluate the impact of agricultural commercialisation choices on livelihoods and to determine whether these are having an impact for different groups. After considering the range of existing indicators, the proposal is to use income-based poverty indicators, calculating the total income of each household. When using income to measure poverty, decisions have to be made on whose income is being compared, what will be counted as income, and how to enable comparison between different households in different circumstances. In addition, asset-based indexes, subjective measures of poverty and the MPI index will also be computed.

References

- Atkinson, A.B., Bourguignon, F., and Morrisson, C.C. (2002). *Income Distribution: Empirical Studies of Earnings Mobility*. Psychology Press.
- Deaton, A. and Zaidi, S. (2002). *Guidelines for Constructing Consumption Aggregates for Welfare Analysis*. LSMS Working Paper No. 135. World Bank, Washington, DC.
- Filmer, D. and Scott, K. (2012). Assessing asset indices. *Demography* 49: 359.
- Filmer, D., and Pritchett, L.H. (2001). Estimating wealth effect without expenditure data or tears: An application to educational enrolments in states of India. *Demography* 38: 115-132.
- Foster, J., Seth, S., Lokshin, M. and Sajaia, Z. (2013). *A Unified Approach to Measuring Poverty and Inequality-Theory and Practice: Streamlined Analysis with ADePT Software*. World Bank Publications, Vancouver.

Hariri, J.G., Bjørnskov, C. and Justesen, M.K. (2015). Economic Shocks and Subjective Well-Being: Evidence from a Quasi-Experiment. Policy Research Working Paper No. 7209. World Bank Group, Washington, DC.

HarvestChoice. (2011). Total livestock population (TLU): 2005. International Food Policy Research Institute, Washington, DC, and University of Minnesota, St. Paul. Available online at: <http://harvestchoice.org/node/4788>.

Johnston, D. and Abreu, A. (2013). Asset Indices as a Proxy for Poverty Measurement in African Countries: A Reassessment. Paper presented at the African Economic Development: Measuring Success and Failure, Simon Fraser University, Vancouver, Canada. Available online at: <http://mortenjerven.com/conference-program-2013/>.

Kingdon, G. G., & Knight, J. (2006). Subjective well-being poverty vs. income poverty and capabilities poverty?. *The Journal of Development Studies*, 42(7), 1199-1224.

McKenzie, D. (2005). Measuring inequality with asset indicators. *Journal of Population Economics* 18: 229.

McKay, A. (2002). *Defining and Measuring Inequality*. Overseas Development Institute, London.

Organisation for Economic Co-operation and Development (OECD). (2013) *OECD Framework for Statistics on the Distribution of Household Income, Consumption and Wealth*. OECD Publishing, Paris.

Organisation for Economic Co-operation and Development (OECD). (2017). Poverty rate (indicator). doi: 10.1787/0fe1315d-en (Accessed on 08 January 2017).

Ravallion, M. (1998). *Poverty Lines in Theory and Practice*. Living Standards Measurement Study Working Paper No. 133, World Bank, Washington, DC.

Ravallion, M. (2012). Poor, or just feeling poor? On using subjective data in measuring poverty. World Bank, Washington, DC.

Ravallion, M. (2017). *Poverty comparisons*. Routledge, London.

Rojas, M. (2008). Experienced Poverty and Income Poverty in Mexico: A Subjective Well-Being Approach, *World Development*, 36 (6), 1078–1093.

Wodon, Q. (2007). Is there a Divergence between Objective and Subjective Perceptions of Poverty Trends? Evidence from West and Central Africa. *Poverty Data, Measurement and Policy Special Expanded Edition*, (282).

World Bank. (2012). *World Development Indicators*, Washington, DC.

World Bank. (2014). *Introduction to Poverty Analysis*. World Bank Group, Washington, DC. Available online at: <http://documents.worldbank.org/curated/en/775871468331250546/Introduction-to-poverty-analysis>.

3 Food and Nutrition Security Indicators

Julia Compton and Steve Wiggins⁸

3.1. Introduction

Food and nutrition security (FNS) is central to people's well-being and their ability to fulfil their capabilities. Food security may be defined as follows:

"Food security exists when all people at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life." (FAO, 1996)

When people are food insecure, their nutrition is likely to suffer. For infants this can mean impaired physical and mental development, with lifelong disadvantages. For everyone, malnutrition in its various forms – calorie-protein deficiency, micro-nutrient deficiency and overweight and obesity – reduces the ability to function, and can result in illness, disability and premature death. It is not for nothing that the second of the Sustainable Development Goals (SDGs) is to: "end hunger, achieve food security and improved nutrition and promote sustainable agriculture."

Agricultural commercialisation can affect food and nutrition security through several pathways (Gillespie *et al.*, 2012; Headey *et al.*, 2011; Wiggins *et al.*, 2015), as follows:

a) **Increased household income** from sales of a commercial crop grown by the household, or from wages earned by working on a commercial farm or estate, or from providing services to other households who have additional income from commercial farming.

Given that households with low incomes spend much of their money on food, and that many farm households are net food purchasers, increased household income is likely to result in more spending on food. The poorest households may buy more starchy staples; while those less poor are likely to buy in a more diverse diet, including animal-sourced foods, fruit and vegetables. Low-income households may also spend some extra income on safer water supplies, soap, and medical attention: improvements to the household health environment that help protect their children against disease which contributes to malnutrition. Increased income can therefore improve nutrition.

When additional income accrues to, or is controlled by, wives and mothers, it is more likely to be spent on food and health for the household than if it is controlled by their male counterparts. When women earn more, their status in the household is likely to rise, giving them more power to make decisions; decisions that are likely to benefit their children.

Not all such extra spending, however, necessarily improves nutrition. As markets become more developed, households may buy processed foods and drinks that are rich in fat, salt and sugar and low in minerals and vitamins – so-called junk food. This can contribute to some members of the household

⁸ Many thanks are due to Anna Herforth (independent), Terri Ballard (FAO) and Marie Ruel (IFPRI), who have been quick to respond to queries, and generously shared their material and practical tips on indicators that they have helped to develop and/or review.

gaining excess weight and exposing themselves to the risks of non-communicable disease, such as cancer, diabetes, heart disease and strokes.

b) **Decreased area of land available and planted for food by households.** Households may switch some land from food crops to new commercial crops, leaving less land for food crops. In some cases, commercial farms and estates may take land from poor households. Compensation may be paid, which allows households to invest in new land or enterprises, but often compensation is inadequate and women in particular are likely to lose out (IIED, 2013; Wiggins *et al.*, 2015). However, estates also sometimes provide land to their workers for kitchen gardens (Smalley, 2013).

With less land planted to food, a household may then produce less food, which could offset any gains from commercial crop earnings, leading to lower food consumption. This may particularly be the case during lean seasons when market prices of food rise, and low-income households buying in food struggle to meet their needs.

c) **Women with decreased time for child care and food preparation,** owing to increased labour on a farm or factory (Slavchevska *et al.*, 2016). Increased external demands on time are associated with less time for child care, including breastfeeding and care of sick children. It may also mean less time to prepare weaning foods. This link depends partly on whether mothers are able to engage other adult women, such as grandmothers, to undertake these tasks. When women spend more time on commercial crops, they may also have less time for growing food, harvesting and post-harvest management, preparation and cooking.

Additional earnings from commercial farming, however, may save mothers time, for example when funds can buy in labour-saving devices – such as piped running water – or when help can be hired in. Commercialisation has been found to increase and reduce women's time, depending on circumstances (Johnston *et al.*, 2015).

When women have less time, the consequences may be: less food grown at home – although, if income permits, some labour may be hired in; a switch to foods that are quicker to prepare; or the use of labour-saving technology, such as switching from pounding cereals and tubers at home, to using a hammer mill. Lack of women's time for childcare has unpredictable effects on children's FNS (Johnston *et al.*, 2015).

d) **Decreased access to common property resources.** Commercial farms and estates may encroach on common land or bar access to forests or water sources. Rural households on low incomes may be especially affected by loss of common land, as the costs of bringing in fuel, or drawing water rise. They may also lose wild and forest foods, such as gathered fungi, fruit, nuts, and game animals.

e) **Men and women expending more caloric energy on labour on commercial farms or in packing houses.** For members of households with very low incomes, with low calorie intakes, extra work may lead to loss of body weight, or leave them with too little energy to live their non-working lives.

f) For commercial farm and estate workers, whether they are **paid in food or cash or both.** How this affects their nutrition is indeterminate, depending on how much food can be bought in local shops and markets, which can vary seasonally; and on the quality of any food rations paid – which may often be poor (Smalley, 2013).

g) **Environmental impacts** from commercial farms and processing plants. Possible pathways include water pollution by run-off of farm chemicals or manure; irrigation canals harbouring disease

vectors; and changes to local microclimates resulting from loss of forest cover. Such effects may undermine nutrition, as for example when water-borne diseases affect young children.

Table 2: Summary of selected linkages to explore through econometric analysis

Hypothesised change: Household starts or increases production of commercial crops, or scheme and/or household member(s) employed as wage labourers in production or processing of cash crop

Potential intermediate outcomes	Outcome, all other things being equal	FNS outcomes to measure and how (see Tables 2 and 3 for details)
Increased household income from sale of commercial crops, or from employment on commercial farms, processing plants, and packhouses.	FNS up (quantity, stability, diversity) – e.g. lower perception of food insecurity, women consume more diverse diet, women’s BMI increases	Household food insecurity , measured by the Food Insecurity Experience Scale (FIES) (quantity/stability)
Increased income of adult women		Dietary diversity , measured by
Increased use of markets to buy in food	Increased access to a diverse diet, with more animal-source foods, vegetables and fruit but also possibly to processed foods rich in fat, salt and sugar.	Minimum Dietary Diversity for Women of Reproductive Age (MDD-W) Women’s Dietary Diversity Score WDDS-MW Consumption of junk food measured by the optional additional categories in WDDS-MW: Q (oils), R (fried snacks), S (sweets) and T (sweetened beverages) (optional) Weight gain (or loss): women’s BMI (optional)
Decreased area of land available and used for food production by household – or by women, but depends on household structure	Less home production of food, less diverse diet.	
Women with decreased time for food production, preparation and child care	Young children less well-fed	
Women put in more physical labour on commercial farms or in packhouses	Women’s BMI decreases	
Labourers paid in food, cash or both	Depends on other variables: payment in food is resistant to inflation, but often poor in quality and diversity.	

i) **More integration of households into markets.** Commercialisation schemes may improve linkages of households to markets, for example by developing local markets, by bringing buyers into the area, or by creating infrastructure.

Such changes may have contrasting results for FNS. Households which are poorly integrated with markets depend more on their own food production than those better linked to markets. More isolated households often produce a greater range of crops and animals, and eat a more diverse diet than better-connected households, where income is more important for dietary diversity (Sibhatu *et al.*, 2015).

More developed markets may also increase the range of food that households can access. This includes both foods that may have a positive impact on nutrition – vegetables, fruit and animal-source foods – and also processed, junk foods that can harm nutrition. The food environment is increasingly considered an important intermediate outcome to measure (Herforth and Ahmed, 2015), but as yet there are no generally accepted indicators for this area.

Many of the above linkages are more suited to qualitative research than quantitative study. Table 2 summarises the list of proposed linkages and indicators that could be investigated through econometric analysis.

3.2. Consequences and indicators for FNS

The literature suggests several indicators of FNS, with recent discussions and authoritative reviews of indicators for use in this area (Cafiero *et al.*, 2014; Herforth and Ballard, 2016; Lele *et al.*, 2016; Leroy *et al.*, 2015; Ruel *et al.*, 2014), culminating in a practical summary of the issues and recommendations for indicators in nutrition-sensitive agriculture projects (Herforth *et al.*, 2016). However, this is an active area of work; some indicators are quite new, and some indicators for outcomes of potential interest are still under development.

Proposed group to measure: women of reproductive age

There are two main potential target groups of particular interest for nutrition outcomes:

- children under two years of age, or in their ‘first 1,000 days’ from conception; and
- women of reproductive age (Black *et al.*, 2008; Ruel *et al.*, 2013; Victora *et al.*, 2008).

The most commonly-used FNS indicators in these groups are survey-based indicators, for example of diet, and anthropometrics, in particular height, weight and age, which are more costly and complicated to collect, especially for children.

The difficulty with selecting children under two years as a target group for APRA FNS indicators is that nutritional outcomes in this group, in particular stunting (low height for age), are affected by factors, especially health, that are subject to many forces other than agricultural commercialisation, meaning that large datasets are needed to demonstrate meaningful linkages.

Recent research (Herforth and Ballard, 2016) shows that although many projects have focused on measuring child undernutrition, in particular stunting, they have effectively wasted their time, because without much larger sample sizes than are possible in most studies, meaningful effects cannot be detected:

“Many project evaluations are statistically under-powered to observe impact on nutritional status, but appear to be powered to observe impacts on food consumption and dietary quality, which we conclude are an appropriate level of impact of agriculture-nutrition projects.” (Herforth and Ballard, 2016: abstract)

3.3. Selection of FNS indicators

The indicators were selected based on the following criteria:

- a) Fit with the theory of change of how agricultural commercialisation may plausibly lead to changes in FNS, without making too many assumptions about other factors. Outcomes such as stunting may be heavily influenced by health and care factors with little relation to commercialisation, so that isolating the effect of commercialisation alone would be difficult;
- b) Likelihood to show a meaningful, statistically significant change over the research period;
- c) Fit easily into household surveys without demanding extra skills or equipment;
- d) High quality indicator: following the terminology of Leroy *et al.* (2015), validated as well-constructed (reflecting high-quality analysis of underlying phenomenon), reliable (replicable), accurate (unbiased, reflects ‘gold standard’ measurements), and equivalent across contexts;
- e) Harmonisation with other users/agencies: select indicators that are commonly collected by other actors and which are well understood.

For **access to food and diet quality**, the choice of indicators is much clearer than it would have been even as recently as three years ago, when a plethora of indicators were used and promoted by different international agencies and NGOs. Some serious work has been put into validation and testing, with the result that most of the indicators reviewed by (Leroy *et al.*, 2015) are no longer in contention.

Table 7 in Herforth *et al.* (2016) summarises the current list of available indicators, with information on the validity and use of each, to recommend the top two indicators, which we have adopted. These are:

- the **Food Insecurity Experience Scale** (FIES); and
- the Minimum Dietary Diversity for Women of Reproductive Age (MDD-W) **Minimum Dietary Diversity — Women** (MDDS-MW).

Although relatively new indicators, both have been extensively validated, and are being rapidly and widely adopted, including for measurement of the SDGs.

Alternatives considered and rejected for food access and dietary quality (for more details and full references see Table 7 in Herforth *et al.*, 2016) comprise:

- The World Food Programme’s (WFP’s) **Food Consumption Score** which still needs further validation, according to reviews by Cafiero *et al.* (2014) and Leroy *et al.* (2015);
- United States Agency for International Development’s (USAID’s) **Household Hunger Scale**: this is most useful for situations of moderate to severe food insecurity;
- USAID’s **Household Food Insecurity Access Scale**: this is similar to FIES but must be validated for each local situation before use; and,

- USAID's **Household Dietary Diversity Score**: this had not been fully validated and has been replaced by the new MDD-W indicator.

Increasingly in rural Africa, a nutrition transition is underway, where diets that were once largely based on starchy foods to provide calories, are increasingly diverse, enriched by more consumption of dairy, fish, meat, fruit and vegetables. This is the same nutrition transition that has taken place in high income countries (Popkin, 2003). While the changes can improve diet and nutrition, diets can become overly high in fat, salt and sugar, especially when some kinds of processed foods – junk foods – become commonly consumed. Increasingly, levels of adults who are overweight and obese are rising in rural Africa. Adult women are a 'leading indicator' for the nutrition transition as they tend to gain weight before men (Garenne, 2011; Imamura *et al.*, 2015; Pawloski *et al.*, 2012).

For measuring the **nutrition transition**, no standardised indicators yet exist.

- The MDD-W does not measure consumption of unhealthy foods such as processed snacks or sugary drinks. However, it has additional optional questions on consumption of these foods and drinks. We suggest that these are included in APRA surveys.
- **Body Mass Index (BMI)** of adult women is likely to be a leading indicator of the nutrition transition in a situation of increased income and access to markets. If possible, this should be included as an indicator. It is not difficult to measure, compared to calculating it for children; but it does require some standard equipment and training, as detailed in Table 3. In some places it may not be socially acceptable for researchers to measure women's height and weight.

The MDD-W is measured through the responses of a single woman of reproductive age per household. If BMI is used, the same individual should be chosen. The FIES, however, can be measured for a household or for an individual. We suggest that the FIES be measured for the individual woman rather than the household. In either case, the questions are asked of an individual (who would answer either for themselves or on behalf of the household). Asking a woman to respond on her own behalf is not only likely to result in more accurate recall, but also enables the FIES indicator to be directly related to the MDD-W indicator in the analysis.

Table 3 summarises the proposed indicators, their advantages and disadvantages, while Table 4 gives field instructions for each indicator including survey questions to be asked, and tips for analysis.

3.4. Handling seasonality in FSN measurements: suggestions

Seasonality is key to many aspects of FSN. In APRA research, some of the aspects that might be affected by seasonality include:

- a) Income: from seasonal sales of farm produce and/or labour on the new estate or factory;
- b) Workload: may be high at planting, weeding, and harvest;
- c) Availability and price of food and other items available at markets; and,
- d) Health: seasonal illnesses such as malaria.

All the chosen indicators are likely to vary by season. It is vital to conduct the baseline and end line surveys at approximately the same season. If possible, APRA should avoid the post-harvest season and the peak of the hungry season, preferably conducting surveys 2-3 months after harvest.

3.6. Proposed indicators: details

Table 3 Description and justification of proposed indicators

Indicator	Why chosen?	Who in household?	Pros	Cons	Instructions and tips
FIES (Ballard <i>et al.</i> , 2013; FAO, 2016) survey module.	<p>Tests hypothesis that improved income (all other things being equal) leads to reduced household insecurity.</p> <p>Validated, survey-based indicator of food insecurity that includes perceptions.</p> <p>Has overtaken other similar indicators in this area.</p>	<p>One woman 15-49 in household.</p> <p>Statistical advice required depending on model selected.</p> <p>Select woman at random, or previous researchers have usually used “the senior wife of the household head” (Marie Ruel, personal comm.).</p> <p>Recommend asking about FIES for the individual woman, and not asking her about ‘the household’.</p> <p>Some evidence from previous scales of this type indicate more reliability when people talk about their own experience.</p>	<p>Simple survey-based instrument that captures psychological as well as physical aspects of consumption. Recently validated internationally as a simple instrument to capture access to food.</p> <p>12-month recall period, hence not very sensitive to seasonality.</p> <p>Harmonisation: used by SDG2, the Comprehensive Africa Agriculture Development Programme (CAADP), and the Food and Agriculture Organization of the United Nations (FAO), among others.</p>	<p>12-month recall period is long.</p> <p>Does not capture food quality aspects (see dietary diversity indicator below).</p>	<p>Eight similar survey questions (all must be used), for example:</p> <p>“In the last 12 months, can you recall a time when...</p> <p>(Q7)... you were hungry but did not eat because there was not enough money or other resources for food?”</p> <p>Full list of questions is in Table 4.</p> <p>Modelling:</p> <p>Instructions on using FIES in regression modelling are in FAO (nd)</p> <p>A recent example of modelling with a similar USA food insecurity scale which inspired the FIES is McIntyre <i>et al.</i> (2016).</p>
MDD-W : survey module (FAO and FHI, 2016; Ruel, 2015) Include optional categories of less healthy foods.	<p>Tests hypothesis that improved income (all other things being equal) leads to improved women’s dietary diversity.</p> <p>Validated, survey-based indicator. Has overtaken other indicators in this area. However the optional categories of less-healthy foods have not been validated.</p>	<p>One woman 15-49 per household, as above.</p>	<p>Access for women is proxy for the household.</p> <p>Child dietary diversity is more subject to issues such as knowledge of care-givers (not in the theory of change).</p> <p>Harmonisation: used by SDG2, CAADP, FAO, and WFP, among others.</p> <p>The categories of less-healthy foods have not been agreed or validated</p>	<p>Changes with seasons (like all dietary indicators). So the endline survey needs to be during the same season (a good idea anyway). Recommended within the four months or so after harvest.</p> <p>24-hour recall is subject to daily variations. If possible, avoid common ‘rest/prayer days’, in particular Ramadan, but</p>	<p>24-hour recall of foods consumed by the interviewee is classified into 10 food groups.</p> <p>Various types of analysis possible but the simplest is percentage of women considered to be consuming the minimum acceptable dietary diversity (i.e. at least five food groups).</p> <p>The suggested approach is to use open ended questions, coded by the enumerator (more relaxed and more accurate, but needs more enumerator training).</p>

Indicator	Why chosen?	Who in household?	Pros	Cons	Instructions and tips
			but are the best option available.	for reasonable sample sizes, this should even out. There are alternatives for household-level food diversity indices, but MDD-W appears to be overtaking these.	Instructions and FAQ at http://www.fantaproject.org/monitoring-and-evaluation/minimum-dietary-diversity-women-indicator-mddw For a weighted population estimate: may need more than one woman in large households. For modelling: this is a dichotomous indicator, with a cut-off point of >4 versus ≤4 Example of modelling: (Bellon <i>et al.</i> , 2016)
Women's BMI for women of reproductive age – measure height and weight.	Tests hypothesis that Improved income, <i>cet. par.</i> , leads to increased weight of adult women in household. The value of this indicator is that it tests for overweight, (an increasing issue in rural Africa, as well as reduced 'thinness'). No other indicators are yet available to test the 'nutrition transition' (Herforth <i>et al.</i> , 2016) although the optional indicators on the MDDW (see above) should give some indication. It could also help test the hypothesis that additional field work on a new commercial crop means that women lose weight or do not gain as much weight as expected from increased income.	All women (or one) aged 15-49 per household. Not knowingly pregnant or within two months of birth.	An increase in BMI of adult women is related to rising incomes in much of rural Africa – from over-thin to overweight (Garenne, 2011; Madise and Letamo, 2017). This indicator can be sensitive to changes within a short time, e.g. work in Mexico with poor rural women showed an average weight gain of nearly 0.5 kg after an average 14 months of receiving social (cash/food) transfers (Leroy <i>et al.</i> , 2013). Harmonisation: used in DHS and other large-scale surveys.	Needs suitable equipment and training for height and weight. (but not too difficult for adult women, compared to calculating it for children). May need additional ethical clearance. Social acceptability varies. Rising weight is often a matter for congratulation. For people living with HIV/AIDS, weight changes could be sensitive.	"In DHS surveys, anthropometric measures are taken by two well trained persons. Height is measured to the nearest millimetre (mm) using measuring boards...Weight is taken to the nearest 100 g.... Measurement procedures are standardized during the training of the field workers." (Cogill, 2003) Detailed instructions can be found in MEASURE DHS and ICF International (2012: 13-21). For a weighted population estimate, may need more than one woman in a large household.

Table 4 How to use the indicators in the field: sampling, survey questions and tips

Interviewee	Survey questions	Additional notes for fieldwork and references
FIES		
Normally, one woman in each household aged between 15 and 49; head of household (if female) or senior wife of household head if male. Not a woman who is pregnant or who has given birth in the last two months.	Now I would like to ask you some questions about food. During the last 12 MONTHS , was there a time when ... : <u>ALL 8 QUESTIONS MUST BE ASKED.</u> (Q1) ... you were worried you would not have enough food to eat because of a lack of money or other resources? (Q2) ... you were unable to eat healthy and nutritious food because of a lack of money or other resources? (Q3) ... you ate only a few kinds of foods because of a lack of money or other resources? (Q4) ... you had to skip a meal because there was not enough money or other resources to get food? (Q5) ... you ate less than you thought you should because of a lack of money or other resources? (Q6) ... your household ran out of food because of a lack of money or other resources? (Q7) ... you were hungry but did not eat because there was not enough money or other resources for food? (Q8) ... you went without eating for a whole day because of a lack of money or other resources?	The words '12 months' are used to avoid ambiguity (confusion with calendar years). Seasonality is important (for all indicators): try to record the baseline and endline during the same season. Ballard <i>et al.</i> (2013); FAO (2016); FAO (nd) – modelling.
MDD-W – including optional category of 'less-healthy foods'		
As above: same woman	Now I'd like to ask you to describe everything that you ate or drank yesterday during the day or night, whether you ate it at home or anywhere else. Please include all foods and drinks, any snacks or small meals, as well as any main meals. Remember to include all foods you may have eaten while preparing meals or preparing food for others. Please also include food you ate even if it was eaten elsewhere, away from your home. Let's start with the first food or drink consumed yesterday. ALL QUESTIONS BELOW MUST BE ASKED. ANSWERS ARE CODED ON A PRE-PREPARED SHEET. Did you have anything to eat or drink when you woke? If yes, what? Anything else? * Did you have anything to eat or drink later in the morning? If yes, what? Anything else? *	The enumerator ticks foods off on a pre-prepared sheet as they are mentioned. The sheet needs to be modified for local diets before training enumerators, but this is not too onerous. Example sheet and full instructions are in FAO and FHI (2016). The sheet should include the optional categories Q (oils), R (fried snacks), S (sweets) and T (sweetened beverages). See above, re seasonality. FAO and FHI (2016); Ruel (2015). Additional FAQ at http://www.fantaproject.org/monitoring-and-evaluation/minimum-

Interviewee	Survey questions	Additional notes for fieldwork and references
FIES		
<p>Normally, one woman in each household aged between 15 and 49; head of household (if female) or senior wife of household head if male.</p> <p>Not a woman who is pregnant or who has given birth in the last two months.</p>	<p>Now I would like to ask you some questions about food. During the last 12 MONTHS, was there a time when ... : <u>ALL 8 QUESTIONS MUST BE ASKED.</u></p> <p>(Q1) ... you were worried you would not have enough food to eat because of a lack of money or other resources?</p> <p>(Q2) ... you were unable to eat healthy and nutritious food because of a lack of money or other resources?</p> <p>(Q3) ... you ate only a few kinds of foods because of a lack of money or other resources?</p> <p>(Q4) ... you had to skip a meal because there was not enough money or other resources to get food?</p> <p>(Q5) ... you ate less than you thought you should because of a lack of money or other resources?</p> <p>(Q6) ... your household ran out of food because of a lack of money or other resources?</p> <p>(Q7) ... you were hungry but did not eat because there was not enough money or other resources for food?</p> <p>(Q8) ... you went without eating for a whole day because of a lack of money or other resources?</p>	<p>The words '12 months' are used to avoid ambiguity (confusion with calendar years).</p> <p>Seasonality is important (for all indicators): try to record the baseline and endline during the same season.</p> <p>Ballard <i>et al.</i> (2013); FAO (2016); FAO (nd) – modelling.</p>
	Did you eat or drink anything at mid-day? If yes, what? Anything else?*	dietary-diversity-women-indicator-mddw
	<p>Did you have anything to eat or drink during the afternoon? If yes, what? Anything else?*</p> <p>Did you have anything to eat in the evening? If yes, what? Anything else?*</p> <p>Did you have anything else to eat or drink in the evening before going to bed or during the night? If yes, what? Anything else?*</p> <p><i>* For each eating episode, after the respondent mentions foods and drinks, probe to ask if she ate or drank anything else. Continue probing until she says "no, nothing else".</i></p> <p><i>If the respondent mentions a mixed dish like a soup or stew, ask for all of the ingredients in the mixed dish. For mixed dishes where it is possible to pick out ingredients or consume only broth, ask if she herself ate each ingredient or if she only had the broth.</i></p> <p><i>Continue to probe about ingredients until she says "nothing else".</i></p>	
BMI for women of reproductive age		

Interviewee	Survey questions	Additional notes for fieldwork and references
FIES		
<p>Normally, one woman in each household aged between 15 and 49; head of household (if female) or senior wife of household head if male.</p> <p>Not a woman who is pregnant or who has given birth in the last two months.</p>	<p>Now I would like to ask you some questions about food. During the last 12 MONTHS, was there a time when ... : <u>ALL 8 QUESTIONS MUST BE ASKED.</u></p> <p>(Q1) ... you were worried you would not have enough food to eat because of a lack of money or other resources?</p> <p>(Q2) ... you were unable to eat healthy and nutritious food because of a lack of money or other resources?</p> <p>(Q3) ... you ate only a few kinds of foods because of a lack of money or other resources?</p> <p>(Q4) ... you had to skip a meal because there was not enough money or other resources to get food?</p> <p>(Q5) ... you ate less than you thought you should because of a lack of money or other resources?</p> <p>(Q6) ... your household ran out of food because of a lack of money or other resources?</p> <p>(Q7) ... you were hungry but did not eat because there was not enough money or other resources for food?</p> <p>(Q8) ... you went without eating for a whole day because of a lack of money or other resources?</p>	<p>The words '12 months' are used to avoid ambiguity (confusion with calendar years).</p> <p>Seasonality is important (for all indicators): try to record the baseline and endline during the same season.</p> <p>Ballard <i>et al.</i> (2013); FAO (2016); FAO (nd) – modelling.</p>
As above: same woman	<p>For the selected woman (or women):</p> <p>Age (DOB) is recorded.</p> <p>Height is measured to the nearest millimetre (mm) using measuring boards.</p> <p>Weight is recorded to the nearest 100 grams.</p>	<p>Detailed instructions and equipment needs are in MEASURE DHS and ICF International (2012: 13-21).</p> <p>Women generally gain weight with age, so age is an important variable to record (as well as for selection of sample).</p> <p>BMI = weight (kg)/height (cm) squared</p>

References

- Ballard T.J., Kepple, A.W. and Cafiero, C. (2013). The Food Insecurity Experience Scale: Development of a Global Standard for Monitoring Hunger Worldwide. Food and Agriculture Organization of the United Nations, Rome. Available online at: www.fao.org/3/a-as583e.pdf
- Bellon, M.R., Ntandou-Bouzitou, G.D. and Caracciolo, F. (2016). On-farm diversity and market participation are positively associated with dietary diversity of rural mothers in southern Benin, West Africa. *PLoS ONE* 11(9): e0162535.
- Bilinsky, P. and Swindale, A. (2010). Months of Adequate Household Food Provisioning (MAHFP) for Measurement of Household Food Access: Indicator Guide (v.4). Food and Nutrition Technical Assistance Project, Washington, DC.
- Allen, L., Bhutta, Z., Black, R., Caulfield, L., de Onis, M., Ezzat, M., Mathers, C. and Rivera, J. (2008). Maternal and child undernutrition: Global and regional exposures and health consequences. *The Lancet* 371(9608): 243-260.
- Ballard, T.J., Cafiero, C., Kepple, A.W. and Melgar-Quíñonez, H.R. (2014). Validity and reliability of food security measures. *Annals of the New York Academy of Sciences* 1331(1): 230-248.
- Candler, T.P., Costa, S., Costello, A., Heys, M. and Viner, R. (2016). G324 Prevalence of thinness in adolescent girls in low and middle-income countries and associations with national wealth, food security, gender inequity and income inequality: A cross-sectional study. *Archives of Disease in Childhood* 101(Supplement 1): A188.
- Cogill, B. (2003). Anthropometric Indicators Measurement Guide. Washington, DC: Food and Nutrition Technical Assistance (FANTA) Project, FHI 360.
- De-Regil, L.M., Harding, K.B. and Roche, M.L. (2016). Preconceptional nutrition interventions for adolescent girls and adult women: Global guidelines and gaps in evidence and policy with emphasis on micronutrients. *The Journal of Nutrition* 146(7):1461-1470.
- Food and Agriculture Organization of the United Nations (FAO). (nd). Modeling Food Insecurity in Bivariate and Regression Analyses. Prepared by the Voices of the Hungry Team. FAO, Rome.
- Food and Agriculture Organization of the United Nations (FAO). (1996). Rome Declaration on World Food Security. Rome.
- Food and Agriculture Organization of the United Nations (FAO). (2006). Food Security Policy Brief. FAO, Rome.
- Food and Agriculture Organization of the United Nations (FAO). (2016). The Food Insecurity Experience Scale Frequently Asked Questions - FAQs. FAO, Rome. Available online at: <http://www.fao.org/3/a-bl354e.pdf>
- Food and Agriculture Organization of the United Nations (FAO) and FHI 360. (2016). Minimum Dietary Diversity for Women: A Guide for Measurement. FAO, Rome. Available online at: www.fao.org/3/a-i5486e.pdf
- Ferro-Luzzi, A., Branca, F. and Pastore, G. (1994). Body mass index defines the risk of seasonal energy stress in the Third World. *European Journal of Clinical Nutrition* 48: S165-178.

Garenne, M. (2011). Trends in Nutritional Status of Adult Women in sub-Saharan Africa. DHS Comparative Reports 27. United States Agency for International Development, Washington, DC. Available online at: <https://dhsprogram.com/pubs/pdf/CR27/CR27.pdf>

Boyle, D., Garrett, D.A., Sangha, J.K. and Kothari, M.T. (2011). Field-friendly techniques for assessment of biomarkers of nutrition for development. *The American Journal of Clinical Nutrition* 94(2): 685S-690S.

Gillespie, S., Harris, J. and Kadiyala, S. (2012). The Agriculture-Nutrition Disconnect in India. What Do We Know?. IFPRI Discussion Paper 01187. Poverty, Health, and Nutrition Division, Washington DC: International Food Policy Research Institute.

Bekele, Y., Goossens, S., Harazi, G., Ouannes, M., Shepherd, S. and Yun, O. (2012). Mid-upper arm circumference based nutrition programming: Evidence for a new approach in regions with high burden of acute malnutrition. *PLoS ONE* 7(11): e49320.

Headey, D., Chiu, A. and Kadiyala, S. (2011). Agriculture's Role in the Indian Enigma. Help or Hindrance to the Undernutrition Crisis?. IFPRI Discussion Paper 01085. Washington DC: International Food Policy Research Institute.

Herforth, A. and Ahmed, S. (2015). The food environment, its effects on dietary consumption, and potential for measurement within agriculture-nutrition interventions. *Food Security* 7(3): 505-520.

Herforth, A. and Ballard, T.J. (2016). Nutrition indicators in agriculture projects: Current measurement, priorities, and gaps. *Global Food Security* 10: 1-10.

Herforth, A. and Harris, J. (2014). Understanding and Applying Primary Pathways and Principles. Brief #1. Improving Nutrition through Agriculture Technical Brief Series. USAID/Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) Project, Arlington. Available online at: https://www.spring-nutrition.org/sites/default/files/publications/briefs/spring_understandingpathways_brief_1.pdf

Dufour, C., Herforth, A., Nicolo, G.F. and Veillerette, B. (2016). Compendium of Indicators for Nutrition-Sensitive Agriculture. FAO, Rome. Available online at: <http://www.fao.org/3/a-i6275e.pdf>

Imamura, F., Micha, R., Khatibzadeh, S., Fahini, S., Shi, P., Powles, J. (2015). Dietary quality among men and women in 187 countries in 1990 and 2010: A systematic assessment. *The Lancet Global Health* 3(3): e132-e142.

International Institute for Environment and Development (IIED). (2013). The Global Land Rush: Securing a Better Deal for Women. IIED, London. Available online at: <http://pubs.iied.org/17150IIED>

Johnston, D., Stevano, S., Malapit, H.J.L., Hull, E. and Kadiyala, S. (2015). Agriculture, Gendered Time Use, and Nutritional Outcomes: A Systematic Review. International Food Policy Research Institute, Washington, DC. Available online at: <https://www.ifpri.org/cdmref/p15738coll2/id/129389/filename/129600.pdf>

Lele, U., Masters, W.A. and Kinabo, J. (2016). Measuring Food and Nutrition Security: An Independent Technical Assessment and User's Guide for Existing Indicators. Food Security Information Network, Measuring Food and Nutrition Security Technical Working Group, Rome.

Leroy, J.L., Gadsden, P., González de Cossío, T. and Gertler, P. (2013). Cash and in-kind transfers lead to excess weight gain in a population of women with a high prevalence of overweight in rural Mexico. *The Journal of Nutrition* 143(3): 378-383.

Ballard, T., Harris, J., Leroy, J.L., Ruel, M., Frongillo, E.A., et al. (2015). Measuring the food access dimension of food security: A critical review and mapping of indicators. *Food and Nutrition Bulletin* 36(2): 167-195.

Madise, N.J. and Letamo, G. (2017). Complex association between rural/urban residence, household wealth and women's overweight: Evidence from 30 cross-sectional national household surveys in Africa. *BMC Obesity* 4: 5.

McIntyre, L., Dutton, D.J., Kwok, C. and Emery, J. (2016). Reduction of food insecurity among low-income Canadian seniors as a likely impact of a guaranteed annual income. *Canadian Public Policy* 42(3): 274-286.

MEASURE DHS and ICF International. (2012). Biomarker Manual: Demographic and Health Surveys Methodology. Prepared for USAID. ICT International, Calverton. Available online at: http://www.dhsprogram.com/pubs/pdf/DHSM7/DHS6_Biomarker_Manual_9Jan2012.pdf

Pawloski, L.R., Curtin, K.M., Gewa, C. and Attaway, D. (2012). Maternal-child overweight/obesity and undernutrition in Kenya: A geographic analysis. *Public Health Nutrition* 15(11): 2140-2147.

Popkin, B.M. (2003). The nutrition transition in the developing world. *Development Policy Review* 21(5-6): 581-597.

Ruel, M. (2015). From the WDDS to the MDD-W: Get to Know the New Indicator for Measuring Women's Dietary Diversity. CGIAR Research Program on Agriculture for Nutrition and Health [online], 22 September 2015. Available online at: <http://a4nh.cgiar.org/2015/09/22/get-to-know-the-new-indicator-for-measuring-womens-dietary-diversity/> (accessed 20 January 2017).

Ruel, M.T., Alderman, H. and Child Nutrition Study Group. (2013). Nutrition-sensitive interventions and programmes: How can they help to accelerate progress in improving maternal and child nutrition? *The Lancet* 382(9891): 536-551.

Ruel, M.T., Ballard, T.J. and Deitchler, M. (2014). Measuring and Tracking the Access Dimension of Food Security: Available Indicators and Recommendations for Future Investments.

Sibhatu, Kibrom T., Krishna, V. and Qaim, M. (2015). Production diversity and dietary diversity in smallholder farm households. *Proceedings of the National Academy of Sciences* 112, no. 34: 10657-10662.

Slavchevska, V., Kaaria, S. and Taivalmaa, S-L. (2016). Feminization of Agriculture in the Context of Rural Transformations. World Bank, Washington, DC. Available online at: <https://openknowledge.worldbank.org/handle/10986/25099> (accessed 12 February 2017).

Smalley, R. (2013). Plantations, Contract Farming and Commercial Farming Areas in Africa: A Comparative Review. Future Agricultures Working Paper 55. Future Agricultures Consortium, Brighton. Available online at: http://bdsknowledge.org/dyn/bds/docs/854/FAC_Working_Paper_055.pdf

Smith, L.C., Dupriez, O. and Troubat, N. (2014). Assessment of the Reliability and Relevance of the Food Data Collected in National Household Consumption and Expenditure Surveys. International Household Survey Network. Available online at: http://ihsn.org/home/sites/default/files/resources/IHSN_WP008_EN.pdf

Victora, C.G., Adair, L., Fall, C., Hallal, P., Martorell, R., Richter, L. and Sachdev, H. (2008). Maternal and child undernutrition: Consequences for adult health and human capital. *The Lancet* 371(9609): 340-357.

Wiggins, S., Henley, G. and Keats, S. (2015). Competitive or Complementary? Industrial Crops and Food Security in sub-Saharan Africa. Overseas Development Institute, London. Available online at: <https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9633.pdf>

4. Women's Empowerment Indicators

Helen Dancer and Naomi Hossain

4.1. Introduction

This paper was commissioned to support research design activities of APRA by reviewing and suggesting indicators on women's empowerment for APRA's research tools and approaches. The authors drew on their knowledge of the field and online institutional websites and academic database searches to identify and catalogue 14 sets or collections of indicators of relevance to APRA, and review literature on the meanings and measures of women's empowerment. Five indicator areas relevant to women's empowerment were identified: unpaid care work, control of income, food security and nutrition, collective action by producer networks and groups, and land rights. These intersect with the indicator sets prepared for APRA by other teams, underlining the importance of embedding questions concerning women's empowerment throughout the various modules of the household survey instrument. In *Work Stream 1* (one of the 3 branches of overall APRA 'workstreams', workstream 1 constitutes an assessment of different types of commercialisation, people's selection choices and outcomes).

Women's economic empowerment is widely agreed to be important for their wider empowerment (Buvinić and Furst-Nichols, 2016; UN Secretary General, 2016; World Bank, 2011), and key indicator areas consistently selected as measures of women's economic empowerment are control over *income* and *land*. Ongoing debates about the appropriate indicators for each draw attention to the need to define issues in relation to local contexts, and therefore for the need for in-depth qualitative research, as part of *Work Stream 2 (Longitudinal analysis of different pathways to commercialisation in different countries and contexts)*.

Standard measures of women's economic empowerment can be individualistic and economistic (Chopra and Müller, 2016; Cornwall and Rivas, 2015; Esplen and Brody, 2007; Eyben and Napier-Moore, 2009). They frequently fail to account for women's unpaid and care work (e.g. Perezniето and Taylor, 2014), therefore missing a key determinant of their paid work behaviour (Antonopoulos, 2008; Chopra *et al.*, 2013; Elson, 1999; Razavi, 2011). Women's disempowerment is not always or only rooted in household relations, and improved economic well-being of individual women may not shift power relations in their favour in the absence of collective action (Kabeer, 2005; Kabeer, 2008). In relation to commercialising agricultural economies, important gendered power relationships may be outside the household, in the realm of markets and governance, as women negotiate over agricultural inputs, contracts, wages and labour rights (Dolan, 2004; IFAD, 2010; Said-Allsopp and Tallontire, 2015; Tallontire *et al.*, 2005). Concerns about methodological individualism and assumptions about women's work have been addressed through the inclusion of an indicator on *unpaid care work*, framed to capture a qualitative measure of the extent of the care effort needed, its distribution, and satisfaction with the quality of care. Another indicator attempts to capture data on *collective action*, focusing specifically on whether women farmers or agricultural workers join together to address common concerns relating to production, services or resources.

APRA also seeks to understand how agricultural commercialisation may affect *food and nutrition security* (FNS). FNS is expected to improve if agricultural commercialisation generates higher productivity and/or agricultural income growth (Von Braun, 1995), and particularly if women are

earning higher incomes. Yet improvements in family nutrition is by no means an assured or even necessarily common effect of women's economic empowerment (Balagamwala and Gazdar, 2013; Bhagowalia *et al.*, 2015; Bold *et al.*, 2013; Cunningham *et al.*, 2015; Johnston *et al.*, 2015). Increasing availability of apparently cheap, tasty and convenient ultra-processed foods may worsen food and nutrition outcomes (Baker and Friel, 2014; Monteiro *et al.*, 2013). A key challenge for APRA is to add to the understanding of the relationship between women's empowerment through agricultural commercialisation on the one hand, and FNS outcomes on the other.

The way in which *land* is acquired, used and managed within households is a key factor for women's empowerment and participation in agricultural commercialisation. Until recently, there was no global consensus as to how to measure the extent of women's land tenure security, or the ownership and management of land within households more generally. However, in April 2018, the UN Inter-agency Expert Group on SDG Indicators confirmed that international consensus had now been reached on methodology for measuring land tenure security, including women's land tenure security. All three SDG indicators on land tenure security (1.4.2, 5a.1 and 5a.2) now have Tier II status. The authors have evaluated the operational implications for APRA of three different approaches explored by Doss *et al.* (2015) that have been used in Food and Agriculture Organization of the United Nations (FAO), ICF International and World Bank datasets. There are challenges associated with generalisability in building a generic set of indicator questions for cross-country comparison that encompass the diversity of forms of ownership and control across different land tenure systems and social contexts.

Indicator 1: Impacts on unpaid care work of women's participation in commercialised agriculture

Accepted best-practice for the measurement of unpaid care work is detailed time-use surveys, which use recall methods to calculate the proportion of different forms of labour performed by different social and age groups (Esquivel, 2011; Esquivel *et al.*, 2008). However, time-use surveys are large, costly and data-heavy exercises, putting them beyond the scope of APRA with its multiple research themes and questions. A number of 'time use-lite' and participatory approaches are also available, including Oxfam's Rapid Care Analysis (Kidder and Pionetti, 2013), which may help to overcome some of the challenges of expensive and data-heavy time-use surveys. The successful use of such tools depends on considerable training and participatory research capacity. APRA indicators should aim to take into account the social organisation of care and focus on well-being and related qualitative issues rather than attempting to measure the impacts quantitatively. Another recommendation is to include a question on how long water gathering takes because of the continued significance of water collection in the drudgery and time-burden of unpaid care work in low income rural communities, such as those to be studied by APRA.

Work Stream 1

Adult women will need to be interviewed as part of household surveys. In a survey instrument, ask of an adult woman (with information about her participation in commercial agriculture):

- 1a) With whose help do you complete all the necessary daily household tasks (specify food shopping, preparation and cooking, care of people including children and sick people, and water and fuel collection)? Choose ONE answer that fits your situation best:

- i. I usually manage fine alone.
- ii. I get a lot of help from other women and girls in the household.
- iii. My husband and I usually divide responsibility for daily household tasks.
- iv. We pay for someone to help with daily household tasks.
- v. Other (specify).

1b) How well are necessary daily household tasks performed in your house? Choose ONE answer that fits your situation best:

- i. Household daily tasks are easily managed in the time available.
- ii. Some household daily tasks get left undone when I am very busy with other work.
- iii. Household tasks get completed, but it is exhausting/I am overworked.
- iv. Important tasks often get left undone (e.g. children go unwashed or unfed).
- v. Other (specify).

1c) How many hours a week does your household spend collecting water?

Work Stream 2

In focus group discussions (FGDs) with adult women participants in agricultural commercial initiatives, ask questions about how their arrangements for managing unpaid care work have changed since they became involved in new commercial agriculture opportunities. Choose a few care responsibilities that are 'very different' from before:

- How has this care responsibility changed since you started (working in the commercial agriculture sector as relevant)?
- What has changed in how you organise your daily care activities?
- Has the time required changed?
- What has changed in terms of the types of support you get for performing care activities?
- How have care roles and responsibilities changed within the family?
- How has the community responded?
- What has changed in terms of goods (e.g. food available in the market) or services (e.g. water, credit etc.) available around care provision?
- Have conditions for accessing these services changed?
- Have these services been affected by agricultural commercialisation?
- Has there been any organised response from the community as a result of these changes?

Indicator 2. Impacts on control of income of women's participation in commercialised agriculture

Control of income is a widely used and established indicator of women's empowerment (Ibrahim and Alkire, 2007). The development of conceptions and cross-context measures of income control marks considerable progress on earlier conceptualisations of unequal power relations, but it remains difficult to operationalise (Kabeer, 1999). The International Food Policy Research Institute's (IFPRI's) Women's Empowerment and Agriculture Index (WEAI) comprises a set of tried-and-tested questions but was

intended to be used as part of a larger index (rather than as stand-alone questions). The questions and calculation methodology used in the WEAI indicators are as follows:

2a) How much input did you have in decisions about the use of income generated from: a) food crop b) cash crop c) livestock d) non-farm activities e) wages and salary, and f) fishing or fishpond culture?

- i. No input.
- ii. Input into very few decisions.
- iii. Input into some decisions.
- iv. Input into most decisions.
- v. Input into all decisions.

For each activity, an indicator is created. It considers the individual to be 'adequate' on input in decisions about the use of income, if he or she participates in that activity and has at least some input into decisions related to that activity.

2b) To what extent do you feel you can make your own personal decisions regarding the following aspects of household life: a) your own wage or salary employment? b) minor household expenditures?

- i. Not at all.
- ii. Small extent.
- iii. Medium extent.
- iv. To a high extent.

For each type of decision, an indicator is created. It considers the respondent to be 'adequate' if he or she makes the decisions himself or herself or if the respondent feels that they could participate in the decision-making at least to a medium extent.

All of these sub-indicators are aggregated into the indicator for control over income. The respondent is considered adequate on control over use of income if he or she is considered adequate in at least one of the sub-indicators described above, as long as it is not in making decisions regarding minor household expenditures (Alkire *et al.*, 2012).

The WEIA formulation is useful for APRA purposes because it captures new income and women's agency with respect to its use. It also relates not only to productive decisions, but also to consumption, and therefore responds in part to questions about how the economic basis for care is affected by the commercialisation of agriculture. The question being proposed here is directly from IFPRI's WEAI set. It is highly credible and has been tried and tested in a number of low income agrarian settings relevant to APRA research. A disadvantage is that the WEAI indicators are not designed to be cherry-picked individually and depend on a two-index set (including a gender parity and an empowerment index). Alone, the indicator makes a contribution to, but cannot capture all the elements of, empowerment as the full or 'Abbreviated-WEAI' do. Other indicators recommended for the APRA set address the areas that WEAI covers but may not allow for scoring and ranking of different women's empowerment levels, as is possible with WEAI.

Work Stream 2

We recommend that either FGDs or longitudinal household case studies are developed that enable a deeper understanding of how household financial decisions get made in both productive and reproductive domains. Participatory and qualitative research tools for exploring issues of control and decision-making with respect to household income in agrarian settings include (Pavanello *et al.*, 2015).

Indicator 3. Food security and nutrition

This section supplements the chapter on FNS indicators (see Chapter 3), by drawing specific attention to the linkages between this area and women's empowerment. While there is common consensus in the literature that women play a key role in household nutritional outcomes that result from agricultural commercialisation (Johnston *et al.*, 2015; Ruel and Alderman 2013, 68-69), there is relatively little research which explores the relationships between commercialisation, women's empowerment and nutritional outcomes. Studies including the World Bank (2007), Meeker and Haddad (2013), SPRING (2014) and Du (2014) see women's empowerment as one of a number of pathways to improved FNS in the context of agricultural change (Verhart *et al.*, 2016: 8-9). The World Bank identifies women's empowerment as a potential fifth pathway alongside increasing (i) food expenditure; (ii) production; (iii) food availability; (iv) economic growth; and (v) women's empowerment. Similarly, Meeker and Haddad (2013) frame six pathways through which nutritional outcomes are affected: (i) agriculture as a source of food; (ii) agriculture as a source of income; (iii) food prices; (iv) women's social status and empowerment; (v) women's time; and (vi) women's own health and nutritional status.

The authors of this chapter share the view of the Food and Nutrition Security paper authors that the FAO's Food Insecurity Experience Scale (FIES) and Minimum Dietary Diversity-Women (MDD-W) indicators should be used to measure food security and diets in household surveys. In addition, we offer suggested hypotheses and questions for qualitative research to supplement this pair of indicators which alone do not capture the relationship between agricultural programmes, women's empowerment and FNS.

Work Stream 2

Further qualitative research will be needed to explore the potential linkages between agricultural commercialisation, women's empowerment and gender relations, and changing household diets. Qualitative research in the form of FGDs and key informant interviews should explore the range of factors behind changes in household food security and nutrition (Meeker and Haddad, 2013). These supplement questions on care work and control over income and the suggested qualitative questions in Chapter 3.

Table 5 Exploring linkages between agricultural programmes, women's empowerment and FNS

Potential linkages (Meeker and Haddad, 2013)	Potential questions for APRA
<i>Women's social status and empowerment:</i> Women's participation in agriculture can affect access to, or control over, resources and assets, and decision-making power on the allocation of food, health and care within the household.	How much input do you feel you have in decisions on the kind or amount of food that is produced on your farm? Has this changed in the past five [or time between surveys] years? If so, what were the reasons for this change?
<i>Women's time:</i> Women's participation in agriculture can affect their time allocation and the balance between time spent in income-generating activities and time allocated to household management and maintenance, care giving and leisure.	Over the course of [the last week] how much time did you spend food shopping, growing and processing food?

	Has this changed in the past five [or time between surveys] years? If so, what were the reasons for this change?
<i>Women's own health and nutritional status:</i> Women's participation in agriculture can affect their health, (e.g. impact of exposure to agriculture-associated diseases) and nutritional requirements (e.g. through increased energy expenditure). These can in turn affect their agricultural productivity and hence income from agriculture.	Have you or any other members of your household experienced any changes in health or energy levels in the past five [or time between surveys] years? If so, what do you consider were the reasons for this change? What has been the impact of any changes in your health and energy levels on your farm work and family responsibilities?

Indicator 4. Collective action by producer networks and groups to address conditions of employment, producer contracts, etc

Work Stream 2

Closed questions about women's leadership or group participation are less satisfactory means of accessing the variable of collective action than in-depth, process-oriented and case-based qualitative research. It is proposed that FGDs with groups of women farmers and workers (organised by sub-sector), and qualitative research with household members and key informants should explore the extent to which groups have succeeded in some of the following:

- Collectively identified actions needed to address constraints to their successful participation in different forms of commercial agriculture (as relevant: farmers', irrigation users, credit groups, or workers' association etc.).
- Mobilised other members, built organisational capacity, or networked and built coalitions with other groups and organisations around the relevant issues.
- Planned and undertaken engagement with public authorities, powerful market actors, or other groups and organisations to advocate change in their interests.
- Succeeded in bringing about change that they consider positive for their participation in commercialised agriculture.
- Raised awareness among the group members of the possibilities of, and need for, collective action with respect to shared concerns.

Qualitative research should seek to identify and to develop case studies of women's empowerment through collective action in agriculture through the APRA project process.

Indicator 5. Land rights

In April 2018, international consensus (Tier II status) was reached on all three UN SDG indicators for measuring land tenure security, including women's land tenure security (UN Tier Classification for Global SDG Indicators 11 May 2018):

- 1.4.2 Proportion of total adult population with secure tenure rights to land, (a) with legally recognised documentation, and (b) who perceive their rights to land as secure, by sex and type of tenure.

5a.1 Proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and (b) share of women among owners or rights-bearers of agricultural land, by type of tenure.

5a.2 Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/or control.

Given the considerable variation in legal frameworks and perceptions of land tenure across different contexts, it is crucial to clarify the definition of ownership, how data is collected and evidenced, as well as the indicators to be used (Doss *et al.*, 2015). The UN SDG indicator 1.4.2 proposes an assessment of tenure security based on documentation and perceptions of land rights, including informal and customary rights, making it difficult to standardise and measure land ownership comparatively. Across contexts, ownership types vary from 'titled', the narrowest identifier of land as property, to 'documented' in a less legalistic sense, or 'effective ownership', through control of the management of the land. This third category is important for understanding decision-making power and responsibility for various stages of planting, harvesting and disposing of crops (De La O Campos *et al.*, 2015: 1; Doss *et al.*, 2015: 405-406). For APRA, it is recommended that indicators are used to measure legally recognised documented ownership and management control, to ascertain the nature of ownership, management and decision-making power at an individual level, irrespective of whether households are 'female-' or 'male-headed'.

A key question for household survey design is whether to frame questions based around the individual or the plot. Both have been widely used in practice. ICF International's Demographic and Health Surveys (DHS) Program instruments have been used to collect data at an individual level in more than 90 countries for 25 years (Doss *et al.*, 2015: 417); while the Living Standard Measurement Study: Integrated Surveys on Agriculture (LSMS-ISA) has been used by the World Bank to collect data in seven African countries (Doss *et al.*, 2015: 418). Both approaches can produce data for comparing sole and joint land ownership between men and women. The plot-based approach may be favoured for surveys which also seek to analyse productivity and developments in the types of crops that are being grown on identifiable plots of land. It also has advantages for identifying how individual plots have been acquired and ownership has been documented within a household. This is important for analysing the consequences of who owns the land for how households participate in commercial agriculture. By comparison, the advantage of making the individual the subject of analysis is that this compares ownership of land between the sexes in a time-efficient manner. Holistic questions on how land is managed and decisions are taken within the household as a whole, can also elicit more meaningful information on gendered power relations. As such, the suggested instrument questions draw upon the ICF and World Bank survey questions but have been tailored for APRA to incorporate plot-based and individual-based questions.

The survey questions are standardised for cross-country comparison but require enumerators to refer to country-specific lists. The questions explore both documented and management control aspects of ownership and use of land. They seek to establish *who* within the household owns the land and *how* it is managed (decision-making power). In order to promote consistency and reliability in the collection of gender-disaggregated data, and to enable cross-checking of answers on plot ownership and management between members of the same household, it is important that survey questions are asked of both a senior woman and a senior man for each household wherever possible. The survey could be timed to take place four months after harvest to coincide with other indicators, including FNS.

Work Stream 1

Questions should be asked of both the senior male and the senior female member of each household surveyed:

Plot-based questions:

Please list all of the agricultural plots that you or anyone else in your household owned, and used but did not own, during the last 12 months.

5a) How was each plot acquired?

- i. Allocated by local government.
- ii. Allocated by traditional leader.
- iii. Allocated by agricultural company.
- iv. Allocated by man's clan.
- v. Allocated by woman's clan.
- vi. Inheritance after death or *inter vivos* from man's family.
- vii. Inheritance after death or *inter vivos* from woman's family.
- viii. Received as a gift.
- ix. Received as bride price.
- x. Purchased.
- xi. Cleared the land and planted permanent crops.
- xii. Borrowed/used free of charge.
- xiii. Used as a customary mortgagee.
- xiv. Rented.
- xv. Sharecropped.

Note that the concept of 'ownership' will vary with local context. Here, it is suggested that land is considered 'owned' for (i)-(xi) and 'used/accessed' for (xii)-(xv). However, this list should be agreed and expanded upon where necessary in consultation with country teams prior to implementation of the questionnaire. Country-specific definitions of ownership/use, in relation to allocation by clan in particular, will need to be clarified. The ability to use the land as collateral or to plant permanent crops would be an important indicator of ownership (as compared with access/use).

5b) For each plot, who owns or acquired the right to use the plot?

- i. Individual woman.
- ii. Individual man.
- iii. Joint (as a couple).
- iv. Joint (other).

5c) Is your household's interest in the plot?

- i. Statutorily registered.
- ii. Legally documented but not registered.
- iii. Undocumented but orally agreed.
- iv. Undocumented and used without permission.

5d) For each registered/documented plot, whose names appear on the documentation?

- i. Individual woman.
- ii. Individual man.
- iii. Joint (as a couple).

- iv. Joint (other).

Individual-based questions:

5e) How much input did you have in decisions about which crops to plant in the household in the last 12 months?

- i. No input.
- ii. Input into very few decisions.
- iii. Input into some decisions.
- iv. Input into most decisions.
- v. Input into all decisions.

5f) With respect to all agricultural land cultivated within your household in the last 12 months, who provided most of the labour for (a) land preparation and planting, (b) weeding, and (c) harvesting?

Code as follows:

- i. Family labour (female adults).
- ii. Family labour (male adults).
- iii. Family labour (male and female adults).
- iv. Family labour (boys < 12 years).
- v. Family labour (girls < 12 years).
- vi. Family labour (boys and girls < 12 years).
- vii. Hired labour (male adults).
- viii. Hired labour (female adults).
- ix. Hired labour (male and female adults).
- x. Hired labour (boys < 12 years).
- xi. Hired labour (girls < 12 years).
- xii. Hired labour (boys and girls < 12 years).
- xiii. No labour used.

A plot-based analysis of legally documented ownership provides a substantive indicator for comparison of land tenure security and control over land between the sexes, while individual-based questions on land management and labour capture subjective perceptions and consequences of landholding arrangements within the household for women's empowerment. In areas where land tenure formalisation policies have been in progress, it may also be possible to track women and men passing from insecure to secure land rights that are legally recognised and changing ratios of gender inequality amongst those with documented land rights. There is huge diversity in policy programming, changing social attitudes to women's inheritance of land and legal recognition of women's land rights across different countries. Changes in gender ratios of men's and women's documented ownership over time may be attributed to multiple factors, of which agricultural commercialisation is only one. Qualitative research should therefore explore the potential connection between commercialisation and gender ratios in documentation and management control of land.

The interests of forest-dwellers, pastoralists and people in rural areas who are not engaged in agricultural production, are also not captured by this set of indicators, which focus specifically on land owned or used by households. Their interests should be explored in FGD/key informant interviews. Qualitative research could also develop case studies on changing rights of access to the commons,

particularly for women who collect firewood and other wild products, and on the extent to which the land rights of indigenous women are being recognised in areas of agricultural commercialisation.

Work Stream 2

Additional qualitative research is proposed in the following areas:

1. Legally documented ownership, including land registration
 - In your location, what obstacles and opportunities exist for obtaining title or other legally recognised documented proof of ownership as a man or woman?
2. For households where land has been titled:
 - When did this happen, who in your household made the decision, and what were the reasons for the decision to register the land in individual/joint names?

Prompt e.g. how the land was acquired, company policies/contractual arrangements, information from local government/NGOs, changing social attitudes, opportunities to use the land as collateral etc.
 - Has this changed in the past five [or time between surveys] years? If so, what were the reasons for this change?
3. Access to the commons
 - Over the course of [the last year] did you or any member of your household collect wild products (e.g. firewood, fish, fruits, honey, mushrooms, animals and birds, edible insects and caterpillars) for home use, consumption or sale? If so, who provided most of the labour for this activity?
 - Over the same time period, have you or any member of your household grazed livestock on common land? If so, who provided most of the labour for this activity?
 - Has this changed in the past five [or time between surveys] years? If so, what were the reasons for this change?

References

- Alkire, S., Meinzen-Dick, R., Peterman, A., Quisumbing, A.R., Seymour, G. and Vaz, A. (2012). The Women's Empowerment in Agriculture Index, IFPRI Discussion Paper 01240. International Food Policy Research Institute, Washington, DC.
- Antonopoulos, R. (2008). The Unpaid Care Work-Paid Work Connection. Levy Economics Institute, Working Paper 541, The Levy Economics Institute, New York.
- Baker, P. and Friel, S. (2014). Processed foods and the nutrition transition: Evidence from Asia: Processed foods and nutrition transition in Asia. *Obesity Reviews* 15 (7): 564-77.
- Balagamwala, M. and Gazdar, H. (2013). Agriculture and nutrition in Pakistan: Pathways and disconnects. *IDS Bulletin* 44 (3): 66-74.

Bhagowalia, P., Menon, P., Quisumbing, A.R. and Soundararajan, V. (2015). What Dimensions of Women's Empowerment Matter Most for Child Nutrition? Evidence Using Nationally Representative Data from Bangladesh. IFPRI Discussion Paper 1367, International Food Policy Research Institute, Washington, DC.

Bold, Van den, M., Quisumbing, A.R. and Gillespie, S. (2013). Women's Empowerment and Nutrition: An Evidence Review. IFPRI Discussion Paper 01294, International Food Policy Research Institute, Washington, DC.

Buvinić, M. and Furst-Nichols, R. (2016). Promoting women's economic empowerment: What works? The World Bank Research Observer 31 (1): 59-101.

Chopra, D., Kelbert, A. and Iyer, P. (2013). A Feminist Political Economy Analysis of Public Policies Related to Care: A Thematic Review. IDS Evidence Report 9, Institute of Development Studies, Brighton.

Chopra, D. and Müller, C. (2016). Connecting Perspectives on Women's Empowerment. IDS Bulletin 47 (1A), Institute of Development Studies, Brighton.

Cornwall, A. and Rivas, A-M. (2015). From 'gender equality' and 'women's empowerment' to global justice: Reclaiming a transformative agenda for gender and development. Third World Quarterly 36 (2): 396-415.

Cunningham, K., Ruel, M., Ferguson, E. and Uauy, R. (2015). Women's empowerment and child nutritional status in South Asia: A synthesis of the literature: Women's empowerment and child nutrition: South Asia. Maternal & Child Nutrition 11 (1): 1-19.

De La O Campos, A., Warring, N. and Brunelli, C. (2015). Gender and Land Statistics: Recent Developments in FAO's Gender and Land Rights Database. Food and Agriculture Organization of the United Nations, Rom.

Dolan, C. (2004). On farm and packhouse: Employment at the bottom of a global value chain. Rural Sociology 69 (1): 99-126.

Doss, C., Kovarik, C., Peterman, A., Quisumbing, A. and van den Bold, M. (2015). Gender inequalities in ownership and control of land in Africa: Myth and reality. Agricultural Economics 46: 403-434.

Du, L. (2014). Leveraging Agriculture for Nutritional Impact through the Feed the Future Initiative: A Landscape Analysis of Activities across 19 Focus Countries. United States Agency for International Development, Arlington.

Elson, D. (1999). Labor markets as gendered institutions: Equality, efficiency and empowerment issues. World Development 27 (3): 611-27.

Esplen, E. and Brody, A. (2007). Putting Gender Back in the Picture: Rethinking Women's Economic Empowerment. Institute of Development Studies, Brighton.

Esquivel, V. (2011). Sixteen years after Beijing: What are the new policy agendas for time-use data collection? Feminist Economics 17 (4): 215-38.

Esquivel, V., Budlender, D., Folbre, N. and Hirway, I. (2008). Explorations: Time-use surveys in the South. Feminist Economics 14 (3): 107-52.

Eyben, R. and Napier-Moore, R. (2009). Choosing words with care? Shifting meanings of women's empowerment in international development. *Third World Quarterly* 30 (2): 285-300.

Ibrahim, S. and Alkire, S. (2007). Agency and Empowerment: A Proposal for International Comparable Indicators. OPHI Working Papers. Oxford Poverty and Human Development Initiative, Oxford.

International Fund for Agricultural Development (IFAD). 2010. Agricultural Value Chain Development: Threat or Opportunity for Women's Employment? Policy Brief 4. Gender and Rural Employment. International Fund for Agricultural Development, Rome.

Johnston, D., Stevano, S., Jean, H., Malapit, L., Hull, E. and Kadiyala, S. (2015). Agriculture, Gendered Time Use, and Nutritional Outcomes: A Systematic Review. IFPRI Discussion Paper 01456. International Food Policy Research Institute, Washington, DC.

Kabeer, N. (1999). Resources, agency, achievements: Reflections on the measurement of women's empowerment. *Development and Change* 30 (3): 435-64.

Kabeer, N. (2005). Gender equality and women's empowerment: A critical analysis of the third Millennium Development Goal 1. *Gender and Development* 13 (1): 13-24.

Kabeer, N. (2008). Pathways of Women's Empowerment: Paid Work, Women's Empowerment and Gender Justice: Critical Pathways of Social Change. Pathways of Empowerment Working Paper 3. Institute of Development Studies, Brighton.

Kidder, T. and Pionetti, C. (2013). Participatory Methodology: Rapid Care Analysis. Oxfam. Available online at: <https://policy-practice.oxfam.org.uk/publications/participatory-methodology-rapid-care-analysis-302415>

Meeker, J. and Haddad, L. (2013). A State of the Art Review of Agriculture-Nutrition Linkages: An AgriDiet Position Paper. An AgriDiet position paper. AgriDiet. Available online at: <http://agridiet.ucc.ie/2013/10/03/a-state-of-the-art-review-of-agriculture-nutrition-linkages/>

Monteiro, C.A., Moubarac, J.-C., Cannon, G., Ng, S.W. and Popkin, B. (2013). Ultra-processed products are becoming dominant in the global food system. *Obesity Reviews* 14 (November): 21-28.

Pavanello, S., Pozarny, P. and de la O Campos, A.P. (2015). Qualitative Research on Women's Economic Empowerment and Social Protection: A Research Guide. Food and Agricultural Organisation of the United Nations, Rome.

Pereznieto, P. and Taylor, G. (2014). A review of approaches and methods to measure economic empowerment of women and girls. *Gender and Development* 22 (2): 233-51.

Razavi, S. (2011). Rethinking care in a development context: An introduction. *Development and Change* 42 (4): 873-903.

Ruel, M. and Alderman, T. (2013). Nutrition-sensitive interventions and programmes: How can they help to accelerate progress in improving maternal and child nutrition? *The Lancet* 382: 536-551.

Said-Allsopp, M. and Tallontire, A. (2015). Pathways to empowerment?: Dynamics of women's participation in global value chains. *Journal of Cleaner Production* 107 (November): 114-21.

Strengthening Partnerships, Results and Innovations in Nutrition Globally (SPRING) Project. (2014). Understanding the Women's Empowerment Pathway Brief #4. Improving Nutrition through Agriculture Technical Brief Series. SPRING, Arlington.

Tallontire, A., Dolan, C., Smith, S. and Barrientos, S. (2005). Reaching the marginalised? Gender value chains and ethical trade in African horticulture. *Development in Practice* 15 (3-4): 559-71.

UN Secretary General. (2016). *Leave No One Behind: A Call to Action for Gender Equality and Women's Economic Empowerment*. High-Level Panel on Women's Economic Empowerment. United Nations Secretary General, New York.

Verhart, N., van den Wijngaart, A., Dhamankar, M. and Danielsen, K. (2016). *Bringing Agriculture and Nutrition Together Using a Gender Lens*. Royal Tropical Institute and SNV, Amsterdam. Available online at: [https://www.kit.nl/gender/wp-content/uploads/publications/56fe2c7688ee2_Verhart%20et%20al%20\(2016\)%20Food%20nutrition%20and%20gender%20\(KIT%20SNV\).pdf](https://www.kit.nl/gender/wp-content/uploads/publications/56fe2c7688ee2_Verhart%20et%20al%20(2016)%20Food%20nutrition%20and%20gender%20(KIT%20SNV).pdf)

Von Braun, J. (1995). Agricultural commercialization: Impacts on income and nutrition and implications for policy. *Food Policy* 20 (3): 187-202.

World Bank. (2007). *From Agriculture to Nutrition: Pathways, Synergies and Outcomes*. World Bank, Washington, DC.

World Bank. (2011). *World Development Report 2012: Gender Equality and Development*. World Bank, Washington, DC.

Indicator sets reviewed

- FAO Food Insecurity Experience Scale: <http://www.fao.org/in-action/voices-of-the-hungry/fies/mk/>
- FAO Gender and Land Rights Database: <http://www.fao.org/gender-landrights-database/data-map/statistics/en/>
- FAO guidelines for measuring household and individual dietary diversity: <http://www.fao.org/3/a-i1983e.pdf>
- FAO Minimum Dietary Diversity for Women: <http://www.fao.org/3/a-i5486e.pdf>
- ICF International Demographic and Health Surveys (DHS) Program: <https://www.icf.com/projects/research-and-evaluation/demographic-and-health-surveys>
- IFPRI Women's Empowerment in Agriculture Index (WEAI): <http://www.ifpri.org/publication/womens-empowerment-agriculture-index>
- IFPRI A-WEAI (abbreviated guide to WEAI): <http://www.ifpri.org/publication/instructional-guide-abbreviated-womens-empowerment-agriculture-index-weai>
- Oxfam Rapid Care Analysis, FGD4: <http://policy-practice.oxfam.org.uk/publications/participatory-methodology-rapid-care-analysis-302415>
- UN Tier Classification for Global SDG Indicators 11 May 2018: https://unstats.un.org/sdgs/files/Tier%20Classification%20of%20SDG%20Indicators_11%20May%202018_web.pdf
- UN Women SDG Monitoring Indicators: <http://www.unwomen.org/en/digital-library/publications/2015/9/indicators-position-paper>
- World Bank Land Governance Assessment Framework (LGAF) Scorecards 2016: <http://web.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTPROGRAMS/EXTARDR/EXTLGA/0,,contentMDK:23379371~pagePK:64168445~piPK:64168309~theSitePK:7630425,00.html>
- World Bank Living Standards Measurement Surveys-Integrated Surveys in Agriculture (LSMS-ISA) project:

<http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTLSMS/0,,contentMDK:23512006~pagePK:64168445~piPK:64168309~theSitePK:3358997,00.html>

- World Bank Measuring women's empowerment/background paper for World Bank workshop on gender and poverty, 2002:
<http://siteresources.worldbank.org/INTGENDER/Resources/MalhotraSchulerBoender.pdf>
- World Bank Rural Development Indicators: <http://data.worldbank.org/topic/agriculture-and-rural-development>

5. Employment Outcome Indicators

Carlos Oya

5.1. Introduction

The overall objective of this chapter is to review options for primary outcome indicators in the area of employment in relation to the preparation of Work Stream 1 and Work Stream 2 of the APRA project *Commercialisation, Women's Empowerment and Poverty Reduction*. More specifically this paper sets out to:

- consider relevant indicators for employment outcomes for quantitative and qualitative research;
- assess the pros and cons of the key indicators;
- advise on measurement options using quantitative or qualitative data;
- assess the data requirements (both quantitative and qualitative) and recommend indicators that can be used by APRA; and
- suggest questions that can be included in data collection instruments (questionnaires and qualitative guides) for the APRA recommended indicators.

This chapter responds to basic questions around key employment indicators and options for data collection in a context of development of agricultural commercialisation, and more generally in relation to agrarian change and rural labour market formation. The paper draws on previous research by the author who has been designing rural labour surveys in Africa since 2001. The paper also draws on and summarises key messages from previous contributions by the author, especially Oya (2015) and Oya and Pontara (2015), which addressed similar questions with a focus on rural wage employment and decent work indicators.

This chapter is organised around references to a hypothetical example in order to address the various questions at hand. The example is one of a Work Stream 1 study involving a commercial investment in a horticulture production and processing facility with core estate and an incipient out-grower scheme. When considering the different outcomes and issues, reference will be made to this hypothetical case for practical purposes of illustration in a scenario highly relevant to this project.

5.2. The challenges of capturing rural employment issues: what is missing and why?

Generally, it is well known that the *quality* of statistics on economic activities, especially in rural Africa, is poor, despite significant improvements in recent decades as a result of a higher frequency of surveys being conducted and better technologies applied to data collection. The weakness of basic agricultural statistics, such as production, productivity and land use is well established (Carletto *et al.*, 2015). In relation to rural employment, previous publications have documented the poverty of rural labour statistics in Africa (Oya, 2013; Oya and Pontara, 2015). This research suggests that there are three types of problems that affect the evidence base for employment outcomes in rural Africa: (a) *relevance*, (2) *reliability* of existing indicators, and (3) *coverage* of employment issues and realities. Not all indicators are relevant; not all relevant indicators are properly captured; existing indicators

may not be reliable; and some key aspects of labour relations are not well covered or are affected by methodological biases.

With respect to relevance, some of the key conventional indicators, such as the unemployment rate or sectoral composition of employment are not particularly appropriate or useful to understanding labour market performance in rural settings of poor countries. The World Bank notes, for example: “the typical indicators of labour force participation (for example, the *employment-to-population ratio*, the *unemployment rate*, *main occupation* and *sector of activity*) derived from the standard questions about the ‘main activity’ are generally inappropriate to capture employment patterns such as these, which tend to be significantly more complex”⁹.

Unemployment rates, for example, are inadequate in contexts where the ‘standard employment relationship’, closer to the notion of formal employment, is the exception rather than the norm. It is essentially largely irrelevant in contexts of widespread poverty where the majority of the population cannot afford to be unemployed in its strict sense. Indicators such as *employment status* may be useful insofar as they can provide a sense of the degree to which labour markets have been formed, how ‘thin’ or ‘thick’ they are (i.e. how relatively developed and common labour market transactions are) and how wage jobs are distributed among different population segments. However, this only works if the assumption that people essentially work in one ‘main activity’ is true. The reality is one of occupation multiplicity, seasonality, irregular employment and substantial heterogeneity of rural livelihoods, as illustrated in research on the ‘rural non-farm economy’ (Davis *et al.*, 2010; Reardon, 1997). The challenge is whether the notion of ‘main activity’ works in order to assign each individual to a *dominant* employment status.

The challenge for employment modules in APRA surveys is to capture:

- The *seasonality* and *irregularity* of the majority of rural employment in low-income countries.
- The widespread ‘informality’ of relations, which make the binary formal-informal rather irrelevant.
- The difficulties in attributing a single employment status to every individual, due to overlapping categories and occupational multiplicity both between and within seasons.
- The real incidence of wage employment, not as a ‘main activity’, but at least as participation in the labour market.

Given the previous ‘stylised facts’ in rural Africa, an investment in a new plantation should not be expected to result in a significant number of *permanent* jobs, but rather in seasonal and casual jobs for different tasks. Therefore, when the *norm* is irregular, seasonal and casual employment – i.e. a vast majority of rural people do not depend on one full-time activity with high frequency (*duration* in terms of months of work and *frequency* as hours per week) – rural livelihoods depend on two basic aspects of employment:

- The effective number of ‘days’ (eight-hour equivalent days) individuals manage to work in any given calendar year with explicit or implicit remuneration (i.e. both returns to self-employment – including household activities – and to wage employment in cash or in kind, including production for own use with an implicit market value).
- The explicit or implicit returns to those activities (per day of work completed).

Therefore, in these contexts, the big issue is time-related *underemployment*, which is the most relevant employment indicator for the dimension of *quantity* of employment. This is formally

⁹ See <http://surveys.worldbank.org/page/labor-experiments>

understood as the result of an “unmet need for employment among the population” (ILO, 2013a: 9)¹⁰. In order to capture the multiplicity of activities and their irregularity/seasonality, the reference period for survey questions is critical and a 12-month reference period is likely to be more suitable to capture the true extent of underemployment than questions referring to the ‘past seven days’. Underemployment is also compatible with situations of ‘excessive work’, since the duration of a ‘day of work’ can vary widely from one job to another, from one period of the year to another, and from one type of task to another. Capturing the multiplicity of activities across sectors, even within the same day, makes the operationalisation of classifications on employment status particularly difficult. This is an important point because the failure to capture different kinds of activity that any individual is involved with in different seasons, within the same season and even on the same day, may lead to biased pictures of the significance of wage employment in such settings, an issue discussed in depth in Oya (2013) and Oya and Pontara (2015). Indeed, official statistics on wage employment in agriculture are patchy and inconsistent across African countries (Davis *et al.*, 2010; Oya, 2013).

This section has highlighted a number of key characteristics of labour relations in rural settings of low-income countries and particularly in Africa, and raised a number of questions on the relevance and biases of the evidence base we have from official statistics. The discussion is relevant for the next section on the choice of key indicators to consider for a programme of studies of the impact of agricultural commercialisation on employment outcomes.

5.3. Key indicators: quantity and quality of labour outcomes

A useful way of devising possible outcomes and indicators for employment is to consider issues of *quantity* and *quality*, on the basis of realistic premises. The combination of a sufficient quantity of employment with high quality of jobs is what normally contributes to poverty reduction and generally better labour outcomes. People may be prepared to work for a certain amount of time, in relation to a year, a month and a week. This decision may of course depend on the quality of opportunities available. Another realistic premise is that very vulnerable labour market entrants may not have a choice, i.e. they will work as much as possible at whatever conditions offered, because their incomes are so low compared to their basic needs. The APRA case studies can work from these realistic premises in order to collect relevant information.

On the quantity dimension, the key question is how often people are employed with a remuneration (explicit and implicit). This is not simply a question of ‘being employed’ or not at any given point in time, i.e. of employment status. In the types of settings relevant to this project, most people are not employed on a formal basis with secure earnings. The most typical situation is that activities are casual, seasonal or even of a high frequency but with varying intensity. Therefore the ‘quantity of employment’ can be better understood in terms of units of time and frequency.

On the quality dimension, there are two main aspects. First are the returns to labour, in terms of explicit remuneration in cash or in kind. Second, the conditions in which work is performed, particularly in relation to health and safety, which can be applied to both situations of wage and self-employment, but also any additional non-wage benefits some employers may offer in a wage employment relationship, which may mean the social wage is higher than the cash nominal wage. Of course, it is important to consider the connections that may exist between remuneration packages/modalities and health and safety as lucidly explored by O’Laughlin (2017)¹¹.

The employment outcome indicators can be organised around a set of broad research questions, which can then be unpacked into more specific questions and translated into indicators. The most

¹⁰ It is also interesting that the concept of unemployment is included in the broad category of labour underutilisation.

¹¹ For example, when payment systems induce maximum effort and fast completion of targets this can affect workers’ health by generating exhaustion and stress among other hazards.

important research questions concerning employment outcomes in a context of commercial agriculture development would be:

RQ1 – How does access to new commercial investment/agricultural markets affect labour participation at household level?

RQ1a – How do labour participation effects differ by gender? How do labour participation effects differ by socio-economic status of households?

RQ1b – What is the incidence of child labour and to what extent does it change with investments or how does it vary across participating and non-participating households? This question can be formulated with reference to paid child labour as distinct from child labour as a form of family labour.

RQ2 – To what extent does employment expand at household and individual level?

RQ2a – To what extent does employment of hired labour expand (by estate and or/smallholder employers)?

RQ3 – What is the labour intensity per unit of land according to scale and participation or not in commercial agricultural ventures? To what extent does it change with new commercial agricultural ventures?

RQ4a – What are the returns to labour associated with activities linked to commercial agricultural ventures? Compare returns to family labour; to wage labour in smallholder farms; to wage labour in estates/plantations; to wage labour in processing facility.

RQ4b – How do returns to labour associated with activities linked to commercial agricultural ventures compare with alternative employment options (self-employment in agricultural and non-farm activities and wage employment in other agricultural and non-farm activities)?

RQ5 – What are the working conditions in commercial agricultural venture besides remuneration? This question refers to: (a) occupational health and safety and can be applied to both self-employed, wage employed and family labour; (b) additional benefits (housing, subsidised credit or advances, subsidised or free food, transport, etc.).

RQ6 – To what extent/how does the commercial agricultural venture affect collective action and association of producers and workers? This question refers to mechanisms of collective action concerning both smallholder producers and wage workers, and may be in relation to trade union density, producer association density and questions on the effectiveness of these institutions in improving employment conditions.

Turning to the example of a new horticultural development project, including investments in processing facilities, estate production and an out-grower scheme, the questions above would be necessary to provide an overall picture of employment impact at various levels, from the point of view of both labour supply and demand, and disaggregated by type of participation and non-participation. Some effects are discernible at household level, some at individual level and some at farm/employer level. It is also possible to collect the same data from different sources for more effective triangulation. There are different forms of disaggregation of respondents (workers) that can be applied to each of the questions, besides participation or not in commercial agriculture, but generally there are four that ought to cut across most questions:

- Socio-economic status (in a continuum of poverty levels provided by asset indices, for example).
- Gender.
- Age.

- Whether migrant or not.

These attributes are relevant because rural labour markets are often segmented around them. Some activities involve relatively poor people, while more prosperous individuals access different jobs. Women may be more present in some activities than men and *vice versa*. Youth employment patterns may also be distinct. Migrant labour also contribute to segmentation and their presence is usually not randomly distributed across locations, sectors and types of farms.

Potential outcome indicators on labour participation, employment status and quantity of employment

In the example of a commercial horticultural venture with both estate production and contract farming, the question of quantity could be reduced to *net job creation* that may be associated with the commercial venture, directly or indirectly. A simple approach to direct job creation would be to count the number of new jobs (as full-time equivalent units) created directly by the nucleus estate if we were to keep the conventional assumption that smallholder out-growers rely on family labour. The reality is more complex than that and the quantitative employment implications of such a venture would require evidence from different sources, considering the potential direct and indirect labour market linkages associated with such investment, i.e. additional hired labour by out-growers as well as induced wage employment in activities that grow as a result of the investments in the area.

There are different questions we would like to address in relation to employment creation, destruction or substitution (i.e. workers moving between different activities in response to changes and new investments), so all the questions below can be addressed in before-after comparative frameworks, i.e. from a baseline picture to an endpoint or midpoint set of outcomes, in a longitudinal approach or as like-with-like comparisons between groups in a cross-sectional design:

1. Questions on labour participation: *To what extent are individuals (by gender, age, socio-economic status etc.) economically active? Do they participate in the labour market?*
2. *What is the level of underemployment (before and years after the intervention/or comparing two settings with/without)?* This refers to the extent to which people find enough work compared to what they wish to work. The focus here is on time-related underemployment. This is relevant for RQ1 and RQ2. Arthi *et al.* (2018) discuss some possible challenges in defining a 'day of work' in rural settings. In relation to this outcome the following questions/indicators matter:
 - a. At the level of individuals, *how many days per month/year/season they work?* This is relevant for RQ2 and RQ3.
 - b. Have individuals spent long periods of time without any economic activity/job? How long? *What was the longest period of time without any remunerated work in the previous 12 months?* This is relevant for RQ1 and RQ2.
3. How many activities do individuals need to engage with in order to make ends meet or to improve their situation? *More generally, what is the degree of occupation multiplicity in the researched context?* This is relevant for RQ1 and RQ2.
4. It is also important to capture the *labour demand* side and how the intervention affects production and labour processes. A key indicator is *labour intensity* per unit of land. A related indicator would be the intensity of hired labour per unit of land, which can also capture relative wage employment creation from the demand side. In particular, key comparisons for total labour input per hectare and for hired labour input per hectare could be between: (a) plots in core estate; (b) plots in participating smallholder out-growers; and (c) plots in non-participating smallholder farms producing same crop.
5. *Questions on employment status* may be relevant if combined with questions above as we would be able to establish a structural pattern and probe the notion of 'main occupation' if

the questions above are properly operationalised. Thus a structural change would be whether the proportion of recorded wage employment as dominant activity was altered by the investment or not, which could be a proxy for labour market formation as long as combined with more precise estimates of average days of wage employment per person per year.

6. Questions on *child labour*, specifying the incidence of paid child labour may also be relevant as a core indicator of decent work and how the impact on the quantity of employment affects the participation of children in economic activities.

Potential outcome indicators on quality of employment

Besides the effects on employment opportunities in the form of new jobs, more days of work, higher labour intensity or new forms of work, the other key dimension to explore is the quality of employment generated. The comparisons can be over time or in with-without frameworks (i.e. comparisons of scenarios/groups *with* or *without* a given intervention), although the former is preferable for obvious reasons. The research questions that are relevant to the issue of quality of employment are those referring to *returns to labour* and *working conditions*.

In the example of the horticultural development with processing, nucleus estate and contract farming, a key aim would be to establish different kinds of comparisons:

- a. Compare the returns to household/family labour on smallholder farms with the wages paid to labourers on the core estate (and processing facility) and with the wages paid to labourers hired by smallholder out-growers, before and after investment.
- b. Compare other aspects of employment conditions between the same groups over time and especially on health and safety and additional non-pecuniary benefits.
- c. Compare returns to labour of participating and non-participating individuals if such comparisons are part of the research design. The best possible comparisons would be between similar types of activities, hence, for example, wages for casual wage labour for a smallholder out-grower in the target investment compared to wages paid to casual labourers hired by non-participating smallholders (same crop and/or different crops to check any crop-specific norms).

A challenge will be to estimate comparable returns to labour, for which the denominator needs to be estimated with some precision, i.e. the time of reference for the remuneration. Ideally daily returns to labour would provide effective comparisons since agricultural work tends to be seasonal/casual. The main challenge will be to compare the same unit of labour time (one day) between wage labour and family labour. Equally, in the case of family labour, assumptions would have to be made in relation to appropriation/distribution of household farm revenues, potentially introducing biases. In the best-case scenario these comparisons are likely to be approximations.

Other aspects of the quality of employment are reflected in RQ5 and RQ6. The main issue is health and safety. Agricultural work is hazardous and often performed under strenuous conditions. Collecting evidence on the conditions in which work is performed is therefore critical to assess employment outcomes, for both hired and family labour.

Finally proxies for collective action and associational membership, as measures of 'empowerment' may be useful to examine the extent to which both producers and workers participating in a horticultural development programme benefit from opportunities to organise themselves and create spaces of collective action that can affect their returns to labour and working conditions.

Proposed shortlist of outcome indicators on employment

For the sake of brevity this section only includes a selection from the range of available options. Considering the multiple demands on data collection from different thematic streams of the APRA studies, a shorter list of indicators that are deemed essential to assess and monitor key trends in employment outcomes in the context of agricultural commercialisation have been extracted.

In order to understand the employment dynamics associated with a process of agricultural commercialisation it is therefore key to focus on those basic aspects that will tell us something about the main labour market outcomes. Did the horticultural development create more jobs (or more remunerated labour time)? Were they mainly in the form of seasonal wage employment or distributed across different categories of employment status? In order of magnitude, to what extent did the development impact on the frequency of employment per person? Did the development tighten local labour markets resulting in higher agricultural wages? Or was the additional labour demand met by plentiful supply of labour, including migrant labour, with the result of keeping wages stagnant? Did the quality of existing employment change in terms of health, safety and selected benefits? If so, did it improve more in certain forms of employment than others? Which farms/forms of production offered the best working conditions?

These and other questions could be tackled with a focus on the five sets of indicators proposed here as 'core'. The data collection options are briefly described in the table below and discussed in section 4.

Table 6. Employment outcome indicators: proposed 'core' set and data collection options

Indicator (with ILO link when similar to a 'Decent Work Indicator')	Relevant research questions	Comments and possible challenges	Data collection options	Survey questions
Number of (person) days of effective employment per year	<p><i>RQ1 – How does access to new commercial investment/agricultural markets affect labour participation at household level?</i></p> <p><i>RQ2 – To what extent does employment expand at household and individual level?</i></p>	<p>This captures how employed people are in terms of time/frequency – it is captured at the level of an individual and can be shown at aggregate level to assess broad employment effects and also be disaggregated by activities, to determine the relative importance of commercial agricultural-related activities. This indicator can also be the basis for estimates of indicators of degree of underemployment.</p>	<p>Household and Employment Survey ☐ Employment module for individuals</p> <p>The main challenge is to obtain an accurate indicator when several casual activities predominate – the use of an employment matrix can help. There are different options of detail, i.e. one focused on a range of agricultural and non-agricultural activities and one focused on agricultural activities mainly with disaggregation by tasks.</p>	<p>Use an employment where all relevant economic activities are listed and checked in terms of whether they apply in each case; then frequency of months, days per month and hours per day are recorded for a 12-month recall, per each activity undertaken. Avoid use of 'main' or secondary occupation. Then the total number of days per year can be estimated from a combination of months and days (adjusted by hours) and disaggregated by specific activities and with different options of aggregation (sector, employment status)</p>
Employment status – adapted, more specific in percentage of individuals	<p><i>RQ1 – How does access to new commercial investment/agricultural markets affect labour participation at household level?</i></p>	<p>In this case we adapt categories of employment status to the relevant research questions and case studies. This indicator can be used to capture the main form of involvement in relation to the commercial agricultural venture, namely:</p>	<p>Household/Individual Employment Survey ☐ Employment module for individuals</p> <p>The main challenge is to obtain an accurate indicator when several casual activities predominate – the</p>	<p>Use employment matrix (as per annex) where employment status for each recorded activity is established in one of the questions. The key issue here is to properly train enumerators to make adequate distinctions between self-employment and</p>

Indicator (with ILO link when similar to a 'Decent Work Indicator')	Relevant research questions	Comments and possible challenges	Data collection options	Survey questions
		<ul style="list-style-type: none"> • wage labour in the processing facility • wage labour in core estate/plantation • wage labour employed by smallholders/contract farmers • wage labour in other agricultural activity • wage labour in unrelated non-agricultural activity • family labour for smallholders in target production areas • self-employed in unrelated non-agricultural business • self-employed in unrelated agricultural activity 	<p>use of an employment matrix can help.</p> <p>There are different options of detail, i.e. one focused on a range of agricultural and non-agricultural activities and one focused on agricultural activities mainly with disaggregation by tasks</p>	<p>wage employment in rural contexts. This is often done badly and a lot of disguised wage employment gets mis-recorded as self-employment (e.g. street vendors).</p>
Hired labour per hectare/per farm (in person days per year)	<i>RQ2a – To what extent does employment of hired</i>	Questions on hired/wage labour can be addressed at employer level (whether core estate farm	Employer/farm-level survey and/or module within a household survey in the case of smallholders.	A household sheet with questions on days of family and external/hired labour is used. A

Indicator (with ILO link when similar to a 'Decent Work Indicator')	Relevant research questions	Comments and possible challenges	Data collection options	Survey questions
<p>AND/OR</p> <p>Labour intensity and labour demand per hectare/per unit of output/per capital invested</p>	<p><i>labour expand (by estate and or/smallholder employers)?</i></p> <p><i>RQ3 – What is the labour intensity per unit of land according to scale and participation or not in commercial agricultural ventures? To what extent does it change with new commercial agricultural ventures?</i></p>	<p>manager or household farm heads/managers) as person-days of hired labour per hectare, for a given target crop.</p> <p>These are questions addressed at employer level (whether core estate farm manager or household farm heads/managers). Questions are formulated for the same crop across categories and with reference to a seasonal cycle, thus generating information on person-days per hectare per season/year.</p>	<p>Given the potential challenges of recall and reliability, any quantitative survey should be complemented with carefully designed qualitative research and field observations to examine any emerging patterns and probe quantitative results.</p>	<p>version of this can be devised which only focuses on hired labour. This can be applied to household farms that hire labour in different forms (e.g. out-growers) and could also be adapted to agribusiness plantations.</p>

Indicator (with ILO link when similar to a 'Decent Work Indicator')	Relevant research questions	Comments and possible challenges	Data collection options	Survey questions
Real wages or an 'agriculture wage index' with an appropriate price deflator	<p><i>RQ4a – What are the returns to labour associated with activities linked to commercial agricultural ventures? Focus on returns to wage labour in smallholder farms; to wage labour in estates/plantations; to wage labour in processing facilities.</i></p> <p><i>RQ4b – How do returns to labour associated with activities linked to commercial agricultural ventures compare with alternative employment options (self-employment in agricultural and non-farm activities and wage employment in</i></p>	<p>This is a key variable, which faces important estimation challenges. A common time denominator is necessary, and day is likely to be more reliable than hours. Norms and conditions will vary across crops and tasks so it will be fundamental to collect as much detailed information as possible about the mode of payment and the time taken to complete the job, especially if task-based or piece-rate payments predominate.</p>	<p>Household/Individual Employment Survey – payment/remuneration module complemented with similar data from employer/farm level survey.</p> <p>Employer/farm-level survey and/or module within a household survey in case of smallholders to probe employers' responses.</p>	<p>The key thing for the questionnaire is to ask questions that would elicit accurate information on different payment modalities and be converted into equivalent daily wages.</p>

Indicator (with ILO link when similar to a 'Decent Work Indicator')	Relevant research questions	Comments and possible challenges	Data collection options	Survey questions
	<i>other agricultural and non-farm activities)?</i>			
Non-wage conditions, including occupational safety and health and non-wage benefits – specific to agriculture e.g. specific indicators and incidence per instances (i.e. use of hazardous chemicals; incidence of certain accidents) as a percentage of workers in any given season/year; also free meals, accommodation, land provided in addition to wages	<i>RQ5 – What are the working conditions in commercial agricultural ventures besides remuneration? This question refers to (a) occupational health and safety and can be applied to both self-employed, wage employed and family labour; (b) additional benefits (housing, subsidised credit or advances, subsidised or free food, transport, etc.).</i>	<p>This is part of the core Decent Work agenda (ILO 2013b) but can be adapted to realities of agricultural contexts and be applied also to own-account producers and contributing family workers. Examples are:</p> <ol style="list-style-type: none"> 1. Incidence of hazards per worker such as snake bites, infections, and so on in any given year 2. Use of pesticides and other hazardous material/equipment (per worker per year) 	Household/Individual Employment Survey – working conditions module for wage workers and household members (if surveyed as individuals) complemented with similar data from employer/farm level survey. It is better to ask these questions to workers and household members as employers routinely lie about them	Questions included in questionnaire for both self-employed and wage-employed farm workers

5.4. Data collection issues and options

Sampling issues

The example of a horticultural development programme with processing, estate farming and small-scale out-growers is useful to address some of the key sampling issues arising in relation to employment outcomes. A key issue is the choice of units of analysis and observation, and therefore at what level data can be collected. In order to address this problem, one needs to consider the following. First, it is important to capture labour supply and demand, and particularly for employment relations, collecting data from the employer as well as from the worker's perspectives is important for triangulation and probing. Second, employment data are usually at the level of the individual. In order to estimate many of the indicators proposed in section three of this chapter, data must be collected through individually-administered questionnaires. This means individuals must be reached through suitable sampling methods. Third, the household as a unit of analysis is important in so far as a significant proportion of employment happens through relations that are negotiated within the household and that indicators of labour inputs in small-scale household farming can be gathered at the level of the household farming unit. Moreover, the portfolio of activities individuals engage with also responds to household-level attributes and decision-making processes. In a nutshell, this means collecting and triangulating data from three different types of sources:

- individuals working (for own households or for a third party);
- household farm heads/managers; and
- large employers, including estate and processing facility management.

For sample size considerations, the required sample size may be large if substantial heterogeneity is anticipated. Homogeneity should not be assumed and all efforts to account for relevant stratification be made for a more realistic sampling approach. If the goal is not broad national-level statistical inference, but capturing a particular issue (wage variation and determinants in agricultural employment) or a particular population (child labour, seasonal migrant labour), sample design must take into account the challenges of finding relevant respondents (especially for 'hidden populations') in the absence of adequate sample frames. In this scenario a job-based framework may be preferable to a residence-based framework for situations in which seasonal migrant labour should be captured regardless of the 'permanent' residence of respondents. In this case the primary sampling unit is the individual, who may be reached by using residential units rather than households units (Cramer *et al.*, 2014). Therefore, it will be important for survey design to consider sampling methods to make sure hidden populations are included even if they are hard to find.

Depending on the decisions on statistical representativeness, different options include:

- Larger sample sizes preceded by in-depth 'pre-survey scoping research' to attempt to identify whether there may important 'hidden groups' in the target context, and where these 'hidden groups' concentrate, or in what kind of residential units they tend to live, so that sampling methods can be devised to capture these groups while keeping the core probability sampling techniques. A careful 'pre-survey scoping research' would look like qualitative scoping/exploratory research combined with consultation with experts who have extensive fieldwork experience in relevant areas.
- Conducting a fresh full census within each area to construct an up-to-date sample frame, including residential units that may house temporary migrants or people without fixed residence, as well as areas where child labour and forced labour are known to be present¹².

¹² See Cramer *et al.*, (2014) for examples of this in Ethiopia and Uganda, and Pincus and Sender (2008) for a related example on 'hidden' migrant populations in peri-urban areas of Vietnam.

This would also mean avoiding potentially biased official village-level lists that may have been designed for the purposes of distribution of rents of some kind¹³.

- Including additional stratification in the sampling stages to be able to capture some of the hard-to-reach groups and over-sample in some cases if necessary.

Sampling decisions will also need to consider the different options in light of possible logistical challenges and time constraints.

Data collection instruments: questions and measurement challenges

The design of data collection instruments is critical to obtain high-quality evidence on a variety of employment outcomes in sometimes challenging scenarios. Key challenges are:

- Accounting for occupation multiplicity.
- Accuracy in the definition of occupations/activities.
- Not missing out on 'hidden' occupations.
- Obtaining realistic measures of frequency of activities.
- Estimating returns to labour.

These challenges can be addressed through a range of actions:

- Avoid problematic concepts of 'main occupation' and instead adopt International Labour Organization (ILO) best practice and use an activity list (*employment matrix*) to determine whether somebody was employed and the frequency and nature of each listed job (Oya, 2015).
- Drop conventional seven-day reference periods (designed to generate internationally comparable statistics) and instead combine different reference periods (12 months, 30 days) as practiced in India, to better capture seasonality and irregular employment.
- Questions will need to consider potential recall problems and adapt recall to type of question and the granularity of data on frequency of different activities. If longer recall periods are used, avoid questions on specific labour inputs in particular plots. Rather, address estimates for overall labour use (across various plots) as lessons from experimental research suggest (Arthi *et al.*, 2018).
- Leave time for sufficient pre-survey scoping research combined with in-depth training in order to avoid the failure to properly capture the incidence and frequency of activities that may be stigmatised and, for that reason, easily be under-reported and overlooked, as it happens with various types of poorly paid casual work for neighbours in parts of rural Africa (Oya, 2013; Mueller, 2015).
- Use appropriate and context-specific terminology for different types of jobs/work as much often gets lost in translation¹⁴.
- For more sensitive questions such as child, forced labour and various forms of harassment, quantitative surveys may not be the only source of information and carefully administered qualitative research will be necessary to better grasp the realities of various stigmatised instances.
- For quality of employment (applied to both wage and self-employment) a recommended option would be to devise separate modules to collect relevant information in each broad type of activity/job. As the GIRM-WB (2007) report shows, specifically designed modules work

¹³ See related ethnographic work in Ethiopia by Bishop and Hilhorst (2010), cited in Cramer *et al.* (2014).

¹⁴ Oya (2015) on Senegal and Rizzo *et al.* (2015) provide concrete examples of instances in which a poor translation or a misinterpretation of key terms leads to measurement error and bias.

well for own-account farming, wage employment in agriculture, own-account non-agricultural business, wage-employment in non-agricultural activities, and questions specific to contributing family workers.

- Each type of activity entails its own challenges and data requirements, and especially quality of employment in contexts of family labour. Carletto *et al.*, (2015) and Samphantharak and Townsend (2012) present detailed accounts of the main challenges. Wage employment requires accurate data on different aspects: the nature/type of employer (scale, ‘formality’ or not, relations, etc.), types of contractual arrangements, whether only labour is provided (and not tools or land), payment methods, levels of remuneration, frequency, non-wage benefits, issues of harassment and conflict, trade unions, etc.
- Calculation of returns to labour requires detailed information on different payment systems (Hatlebakk, 2004; Rogaly, 2005) and time estimates for different tasks/jobs so that payments (daily wages, piece-rates, task wages, in-kind payments etc.) can be converted to a common unit.

In order to meet the various challenges briefly described here, the survey design for a project on agricultural commercialisation could include different questionnaire modules aimed at different units of analysis and respondents. Thus:

1. **Landholding-level module**, or ‘employer perspective’ of users of hired and family labour, the main aims of which could be:
 - a. Overview of labour input to the landholding, wages and costs, which could be triangulated with evidence collected at individual/worker level.
 - b. Identification of seasonal work patterns;
 - c. Understanding the internal division of labour on the landholding (i.e. who does what?);
 - d. Identification of challenges regarding labour mobilisation and labour processes.
2. **Household member module (for members of a farm household)**, which aims to:
 - a. Capture labour input to the landholding;
 - b. Capture labour market participation, besides work on own landholding;
 - c. Identify the working activities of the household members (i.e. who does what?) and their contribution to the agricultural activities of the farm holding as well as outside the holding;
 - d. Identify possible age/gender-based disparities regarding participation in: i) own-consumption work, ii) paid work, iii) services for the household and iv) work outside the landholding;
 - e. Address selected decent work issues, especially in relation to health and safety and excessive working hours.
3. **External/hired workers module**, which intends to:
 - a. Capture labour input to the landholding;
 - b. Identify the working activities of the external workers (i.e., who does what?) on the small farmer landholding;
 - c. Identify possible age/gender-based disparities on wage, work conditions, etc.;
 - d. Analyse basic decent work issues and payments with a focus on agricultural activities.

The three proposed modules could be administered according to the following logic:

1. The household/holding module could be administered to the holding manager (or principal respondent of the holding/estate farm), i.e. the person who has the most accurate information about the holding. We consider both agricultural and non-agricultural activities even though the main focus would be on agricultural activities. The information provided in this module is therefore based on the 'employer' of a household and hired labour, and can provide an overview of active workers and labour input per task/activity.
2. All three modules collect detailed information about *labour inputs* but:
 - a. The holding/household module also offers data on the *stock* of household and external workforce involved (for at least one day) in contributing to holding activities.
 - b. There are questions about labour inputs per type of worker in the three modules but the household member questionnaire also includes activities outside the holding.
 - c. The module for external/hired workers could (a) only include inputs into the holding of reference, or (b) provide a full account of labour inputs of this individual more generally, with the first option being better if we need a detailed breakdown by task for agricultural activities. This data can be triangulated with holding-level responses.
 - d. In both household member and external workers (hired labour) cases, the use of employment matrices with no mention of 'main occupation' will help establish a more complete employment picture and more accurate estimates of person-days of employment per year.
3. The three modules provide questions on payments and some decent work questions, though to a limited extent due to space constraints and the assumption that a more detailed decent work questionnaire would be applied another time.
4. Apart from the benefits of triangulation and cross-checking across modules, the household member and external worker questionnaires should be slightly more detailed in terms of employment outcomes, but the holding questionnaire allows for a quick comparison of conditions among different workers and for a bigger picture for all agricultural activities and related payments.

If surveys only focus on some of the questions and not all then perhaps the combination of two modules (1 and 3) would suffice.

5.5. Concluding remarks

This section has presented a number of possible indicators for employment outcomes and their main rationale. After a brief discussion of key challenges encountered in data collection on employment issues in rural settings of low-income countries – and specifically in rural African contexts – this paper proposes a number of research questions and their associated indicators to capture employment dynamics in a context of commercial investments in agriculture, with the aim of capturing different aspects of the quantity and quality effects on employment.

The paper presents a shortlist of five core indicators which would help us tackle questions such as: Did the development of agricultural commercialisation create more jobs? In order of magnitude, to what extent did commercialisation impact on the frequency of employment per person? Did increased agricultural commercialisation tighten local labour markets resulting in higher agricultural wages? Did the quality of existing employment change in terms of health, safety and selected benefits? If so, did it improve more in certain forms of employment than others? Which farms/forms of production offered the best working conditions?

In order to address these questions and collect accurate information for selected indicators, the paper presents a number of challenges and options for sampling, as well as different possibilities for data collection, especially in terms of a variety of instruments (questionnaire modules) to be applied to different units of analysis for purposes of complementarity and triangulation. Whether all these options are applicable to APRA surveys depends on the logistical constraints and the time required for other modules. From the options presented, a further selection is indeed possible. Trade-offs are of course unavoidable and some of the ideal options proposed here may need to be sacrificed so other topics are also covered well. However, it is important to bear in mind that cutting corners often comes at the expense of the quality of evidence collected. If trade-offs are faced, research teams will need to make difficult decisions about which indicators should be dropped and with what consequences for the analysis of the outcomes of agricultural commercialisation.

References

- Arthi, V., Beegle, K., De Weerd, J. and A. Palacios-López. (2018). Not your average job: Measuring farm labor in Tanzania. *Journal of Development Economics* 130: 160-172.
- Carletto, G., Jolliffe, D. and Banerjee, R. (2015). From Tragedy to Renaissance: Improving Agricultural Data for Better Policies. Policy Research Working Paper, No. 7150. World Bank, Washington, DC.
- Cramer, C., Johnston D., Mueller B., Oya C. and Sender J. (2014). How to do (and how not to do) fieldwork on Fair Trade and rural poverty. *Canadian Journal of Development Studies/Revue canadienne d'études du développement* 35(1): 170-185.
- Davis, B., Winters P., Carletto G., Covarrubias K., Quiñones E. J., Zezza A. and Di Giuseppe, S. (2010). A cross-country comparison of rural income generating activities. *World Development* 38(1): 48-63.
- Hatlebakk, M. (2004). Attached Labor in Nepal: A Field-Study of Landlord-Labor Relations that are Misrepresented in the Nepal-LSMS data. Paper presented at 75-years of Development Research conference. Cornell, 7-9 May.
- International Labour Organisation (ILO). (2013a). Resolution Concerning Statistics of Work, Employment and Labour Underutilization. ILO, Geneva.
- International Labour Organisation (ILO). (2013b). Decent Work Indicators – Guidelines for Producers and Users of Statistical and Legal Framework Indicators. Second Version. ILO, Geneva.
- Mueller, B. (2015). Tanzania's rural labour markets: The missing link between development and poverty reduction. In: *Rural Wage Employment in Developing Countries: Theory, Evidence and Policy*. Edited by Oya, C. and Pontara, N., p144-177. Routledge, London.
- O'Laughlin, B. (2017). Consuming bodies: Health and work in the cane fields in Xinavane, Mozambique. *Journal of Southern African Studies* 43(3): 625-641.
- Oya, C. (2013). Rural wage employment in Africa: Methodological issues and emerging evidence. *Review of African Political Economy* 40 (136): 251-273.
- Oya, C. (2015). Decent Work Indicators for Agriculture and Rural Areas: Conceptual Issues, Data Collection Challenges and Possible Areas for Improvement. ESS Working Paper No. 15-10. Food and Agriculture Organization of the United Nations, Rome.
- Oya, C. and Pontara, N. (2015). Introduction: Understanding rural wage employment in developing countries. In: *Rural Wage Employment in Developing Countries: Theory, Evidence, and Policy*. Edited by Oya, C. and Pontara, N., p1-36. Routledge, London.
- Pincus, J. and Sender, J. (2008). Quantifying poverty in Viet Nam: Who counts?' *Journal of Vietnamese Studies* 3(1): 108-150.

Rizzo, M. Kilama, B. and Wuyts, M. (2015). The invisibility of wage employment in statistics on the informal economy in Africa: Causes and consequences. *Journal of Development Studies* 51(2): 149-161.

Rogaly, B. (2005). *Agrarian Capital, Wage-Workers and Space*. University of Sussex, Mimeo.

White, H., Leavy, J., Mulumbi, M., Mulenga, G. and Seshamani, V. (2006). *Rural Development and Labour Markets in Africa: Preliminary Findings from a Research project in Northern Province, Zambia*. Institute of Development Studies, Brighton.

Samphantharak, K. and Townsend, R. (2013). *Risk and Return in Village Economies*. NBER Working Paper No. 19738. National Bureau of Economic Research, Massachusetts.

World Bank. (2012). *World Development Report 2013: Jobs. Overview*. World Bank, Washington, DC.